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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

HASTINGS LECTURE:
Health and Empire. By Sir ANDREW BALFOUR, F.R.C.P. 549

ORIGINAL ARTICLES.
Ætiology of Disseminated Sclerosis. By K. CHEVASSUT, M.Sc.—(*Illustrations on Special Plate*) 552
A Specific Vaccine Treatment in Disseminated Sclerosis. By Sir J. PURVES-STEWART, F.R.C.P. 560
Calcification of the Pericardium. By G. E. VILVANDRÉ, M.R.C.S.—(*Illustrations on Special Plate*) 564
Disseminated Encephalomyelitis following Smallpox. By A. G. TROUP, M.D., and E. W. HURST, M.D.—(*Illustrations on Special Plate*) 566
Malignant Change in a Chronic Duodenal Ulcer. By Prof. E. H. KETTLE, M.R.C.P.—(*Illustrations on Special Plate*) 570

MEDICAL SOCIETIES.
Medical Society of London: Cardiac Infarction 571
Royal Society of Medicine: Section of Anæsthetics.—Spinal Analgesia with Spinocain 573
Medico-Legal Society and West London Medico-Chirurgical Society: The Doctor in the Law Courts 574
Edinburgh Obstetrical Society 575

NEW INVENTIONS.
Excreta Examination Device. By DAVID A. HERD, L.R.C.P.—(*Illustrated*) 578

REVIEWS AND NOTICES OF BOOKS.
Affections of the Eye in General Practice. By R. Lindsay Rea, F.R.C.S. 576
Common Infections of Female Urethra and Cervix. By Frank Kidd, F.R.C.S., and A. M. Simpson, M.B. 576
Otologic Surgery. By Prof. S. J. Kopetzky, M.D. .. 577
Short History of R.A.M.C. By Col. Fred Smith.... 577
Manual of Proctology. By T. C. Hill, M.D. 577
Elementary Materia Medica. By W. W. Krueger, Ph.B. 578
Nursing Care of Communicable Diseases. By M. E. Pillsbury 578
Edinburgh Medical Journal 578

LEADING ARTICLES.
CLINICAL RESEARCH AND EXPERIMENTAL MEDICINE..... 579
ÆTIOLOGY OF DISSEMINATED SCLEROSIS 580
HEALTH AND EMPIRE 581
THE REGISTRATION OF INDIAN MEDICAL DEGREES..... 582

ANNOTATIONS.
Child Psychology 583
Pulmonary Tubercle of Bovine Type 584
Ætiology of Psoriasis..... 584
Draft Poor Law Order.... 585
Œsophageal Obstruction in Children 585
Liver in Anæmia 586
Clinical Effects of Ovarian Hormone 586
New Methods in Spinal Analgesia 587
Congress of Dermatology at Copenhagen 587
The Acts of Rahere 587

MODERN TECHNIQUE IN TREATMENT.
CCC.—The Treatment of Hæmoptysis. By F. G. CHANDLER, F.R.C.P..... 588

CORRESPONDENCE.
Variola Major and Minor (Dr. C. K. Millard)..... 593
Protection Against Measles. (Dr. Hugh Barber) 593
Social Customs and Infant Mortality (Dr. N. R. S. Gupta)..... 593
Spinal Anæsthesia (Dr. L. O'Shaughnessy) 594
Food or Drug? (Dr. E. Graham Little, M.P.) .. 594
Rest in the Treatment of Gonorrhœa (Dr. J. B. Byles)..... 595
Technique of Transfusion (Dr. H. M. M. Woodward) 595

SPECIAL ARTICLES.
Studies of Virus Diseases. The Medical Research Council's Survey of the Position 589
Australasia: Appointments at Sydney 591
Medical Society of London: Anniversary Dinner.... 592
Medicine and the Law: Doctor's Right to Choose his Patients 602
Infectious Disease in England and Wales.... 602

THE SERVICES.
Royal Naval Medical Service.—Royal Army Medical Corps.—Royal Air Force.—Indian Medical Service.—Colonial Medical Services.—Deaths in the Services 595

OBITUARY.
Horace Stansfield Collier, F.R.C.S. 601
George Murphy, M.R.C.S. 602
Ann Low Horne, L.R.C.P. 602

PARLIAMENTARY INTELLIGENCE.
Notes on Current Topics: The Mental Treatment Bill 596
House of Lords: Housing and Slum Clearance.... 598
House of Commons: Seven Years' Limit and Pension Claims.—Vaccination of School Children.—Feeding of School Children.—Opium Manufactured in India.—Cerebro-spinal Meningitis in the Navy—Increase of Motor Accidents.—Experiments on Animals.—Panel Practitioners and Excessive Prescribing.—Certified and Grade A (TT) Milk.—Paupers and Vaccination. Local Authorities and Birth Control.—Silicosis.—Supply of Radium.—Approved Societies' Reserve Funds.—Sale of Reconstituted Milk.—Doctors and Excessive Prescribing. — Sickness and Disablement Benefits.— Industrial Health Research Board. 599

MEDICAL NEWS.
University of Cambridge .. 603
A Grimsby Maternity Home 552
Minor Helps of Hospitals.. 552
Hospital Costs 560
New Hospital at Tiverton 569
Rest Rooms at St. Bartholomew's Hospital 583
Contributions by Hospital Patients 591
City of London Maternity Hospital..... 592
An Enlarged Cottage Hospital..... 601
Memorial to Lord Hambleden 601
Medico-Legal Society 603
Society of Medical Officers of Health 603
Irish Medical Schools' and Graduates' Association 603
League of Roses 603
Albert and Victoria Hospital Aid Society 603
The King George Hospital, Ilford 603
King Edward's Hospital Fund 603
Panhellenic Health Exhibition 603
London School of Hygiene and Tropical Medicine .. 603
General Lying-in Hospital 603
Royal Medical Benevolent Fund 603
Sheffield Ambulance Service 603
Liverpool Women's Hosp. 603
North Middlesex Hospital 603
Enlargement of Finchley Hospital 603
Hospital Treatment for Motor Cyclists 603
Work of Sunderland Infirm. 603
Washing Facilities in Bakehouses 603
Wolverhampton Eye Infirmary 604
Radium Therapy in Cancer 604
London School of Medicine for Women 604
Public Assistance Hospital Arrangements 604

NOTES, COMMENTS, AND ABSTRACTS.
Municipal Control of the Sale of Milk and Bread 606
New Preparations: Squibb's Cod-liver Oil.—Cremor Alkalinus A. & H. 606
The Available Supply of Radium 606
Radium: An Unreturned Loan 606

Medical Diary 604
Appointments—Vacancies 605
Births, Marriages, Deaths 605

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NOTES ON INTERESTING CASES.—RADIOLOGICAL NOTES.—NEW INSTRUMENTS AND APPLIANCES.—MUSEUM SPECIMENS.—TIMETABLE SHOWING UROLOGICAL WORK.—ABSTRACTS FROM CURRENT LITERATURE.—INDEX TO CURRENT UROLOGICAL LITERATURE.—REVIEWS OF BOOKS.

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ABSTRACT OF THE

Hastings Lecture

ENTITLED

HEALTH AND EMPIRE.

Delivered at the British Medical Association House on March 12th, 1930,

BY SIR ANDREW BALFOUR, K.C.M.G., C.B.,

DIRECTOR OF THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

[Sir Andrew Balfour, taking for his opening text the phrase "Bora afia," which means in the Swahili tongue "Health is the chief thing," commenced with a moving description of the risks and hardships of those who founded the British Empire by their enterprise and endurance, continuing :—]

If, in that great struggle for domination, too much account had been taken of sickness and pestilence, it is conceivable that the goal would never have been attained. Still, there is a great difference between a reasonable care of health and a reckless squandering of life, and time and again the latter was in evidence, and such knowledge as had been gained by bitter experience was cast into the melting-pot. Lest we forget, and with the view of contrasting the conditions which prevailed during the period of foundation and expansion with those obtaining to-day, it seems desirable to glance briefly at some of those perils to health which our forbears had to face. In doing so we can but wonder at the courage and tenacity which enabled the pioneers of Empire to triumph over disease and death, the while we deplore the needless loss of life, the lack of lore, and the short-sightedness which brought thousands upon thousands to an untimely end.

Let it be remembered that, until comparatively recently, the heart of the Empire itself was far from sound. In the spacious days of the Virgin Queen those who fared foreign encountered diseases with which they were quite familiar at home, though it is true they often encountered them in more terrifying guise than that to which they were accustomed. Unable to cope with them in the motherland, they were still less able to deal with them abroad and this, in certain directions, remained true until last century had run much of its course. England was scourged by cholera as late as 1866, and in 1869 relapsing fever was claiming victims in the poorer parts of London. In 1863 malaria formed the subject of inquiry, for it still persisted to a considerable extent in the fen lands and the marshes. One disease, not often seen ashore, but which dogged the mariner and the gentleman adventurer afloat was the sea scurvy which, until the addition of lemon-juice to the sailor's ration, played havoc with the personnel of the Navy and the mercantile marine. This was in the old days of sailing ships and long voyages, and before a simple and single remedy magically controlled it. Yet, although Hawkins saved his crews with lemon-juice in the Azores in 1590, it was not until 1844 that it was made a compulsory issue in the British Navy, despite all the efforts of the great naval hygienist, James Lind, in the preceding century and those of his disciples and fellow countrymen, Trotter and Blane.

THE PRICE OF WAR.

It is also worth noting, as showing how Empire building may favour the ravages of disease, at least when war is the trowel, that there were no less than 10,000 cases of scurvy amongst our Indian troops in Mesopotamia during the last campaign. Truly "Disease and Empire" would be a better title for this discourse than that which it bears. That such is indeed the case is shown by various happenings throughout the seventeenth and eighteenth centuries. It is, of course, impossible to deal with these in detail, but a few examples may be culled at hazard which indicate how correct was Lind, at least with respect to the Navy, when, in the Advertisement to his remarkable essay on the preservation of the health of seamen, he wrote: "For the number of seamen in time of war, who die by shipwreck, capture, famine, fire or sword, are but inconsiderable in respect of such as are *destroyed* by the ship diseases, and by the usual maladies of intemperate climates."

[The lecturer then referred his hearers to the pages of Roderick Random and to Smollett's account of the destruction wrought among ship's companies by yellow fever. Other pertinent references were to the account written by Charles Curtis, a naval surgeon, of the "Diseases of India as they appeared in the English Fleet and Naval Hospital at Madras in 1782 and 1783"; to Shield's graphic description of the Batavian epidemic of 1800; and to the letters of a certain Dr. Pinckard, physician to the Bloomsbury Dispensary, whose letters, sent home when serving with Sir Ralph Abercromby's expedition at the close of the eighteenth century, were published in 1806. Passing from the disasters due to diseases among the fleets and armies, Sir Andrew Balfour told briefly the story of the ill-fated Darien scheme, where disease proved as fatal as it did 200 years later, in almost the same spot, when attacking the original constructors of the Isthmus of Panama. He continued :—]

It must also be remembered that if, in the olden days, the Empire paid scant heed to the health of its white populations it paid even less to that of the native races which passed under its sway, except here and there in the case of slaves which possessed monetary value. Now, however, it has shouldered the white man's burden and throughout its length and breadth the care of the health of native communities is a feature of modern administration. What this means is not always fully realised. I have said elsewhere that a skilled and sympathetic doctor is more of a civilising and pacifying force than a company of infantry, and a well-run hospital has greater power in the long run than a battery of maxim guns. Some may be disposed to think this statement an exaggeration, and yet what do we find? The latest medical report from Fiji contains a chapter by Dr. J. M. Lambert on the work of the Western Pacific Health Service, in the course of which he says :

> "There is a certain amount of grim romance about our work in the Solomons. In October, 1927, on the savage island of Malaita, the District Officer, his white assistants, and numbers of native police were killed on a tax-collecting tour. A very few years ago, the answer to that might have been the punitive visit of a war vessel, a shelling of the district and indiscriminate killing of natives. On this occasion there was a painstaking arrest and a fair trial of accused participants. Within three months, also, the Government had two yaws and hookworm units at work on this island. The work has been continued there for the year except for a week or so, when they were transferred to another island because a rumour, which proved without foundation, said they were to be lured back into the hills and massacred. Immediately after they left, Malaita native delegations began to approach Government for their return, showing that only a few months of the work had given them an appreciation of the benefits received."

The change for the better began in this country, though there were not lacking powerful influences abroad and more especially in India which, under British rule, has, in certain respects, always been a remarkable centre of medical and hygienic activity. Yet it was the new outlook in England about the middle of last century, an outlook which resulted from the enthusiasm and the unremitting labours of Edwin Chadwick and his disciples, which laid the foundation of all that followed. The pioneers of sanitary reform preached the gospel of cleanliness and that comparatively simple evangel accomplished great things both at home and abroad. The gospel

might be a simple matter, but its acceptance by those in high places and by the populace was very much the reverse, even when repeated cholera outbreaks came to the assistance of the reformers, and it needed the most dogged determination to effect a sanitary revolution. A lesser man than Chadwick would have given up in despair but, aided by Southwood Smith, Simon, and others of like kidney, he would not acknowledge defeat and well earned this fine tribute paid him in 1890 by another of his followers, Sir Benjamin Ward Richardson:

"For so much labour on behalf of the health of this nation, and of all nations which profit by English industry, few public men of this century have received fewer public rewards or favours than this man who, born with the century, stands probably at the present moment of it, when compared with others of the same term of years, absolutely alone in the possession of ability, enthusiasm and genius. Happily no reward, no thanks can surpass those which have come so richly and so silently in the results he has lived to see as the fruits of his labours: the foundation of a new life-saving science; the gratitude of the best and wisest of mankind; the acknowledged baptism of an imperishable name."

What Chadwick and the other pioneers did was to place sanitation upon a sound basis, to invoke the majesty of the law on its behalf, and to make obedience to the laws of health an integral part of the life of the people. Naturally, when the efficacy of public health work had become established in Great Britain, those possessions which now constitute the great Dominions were not long in following the lead of the Motherland and putting their respective houses in order.

On the whole the problems to be met and mastered in Canada and New Zealand resembled very closely those which this country had to face in its efforts to secure sanitary salvation, but South Africa and Australia had special troubles of their own. Thus, from 1889 onwards South Africa had to cope with plague and, of late years, its plague problem has assumed special features and has presented peculiar difficulties owing to the infection of the veldt rodents. In Australia, and also in New Zealand, the prevalence of hydatid disease, due to a parasitic worm, has introduced questions and measures which are unfamiliar in the old country; plague in Australia was at one time a cause of trouble and expense; while the fact that a considerable part of the Australian continent is within the tropic zone has necessitated attention being paid to the matter of acclimatisation and to the prevention and cure of ankylostomiasis. In both South Africa and Australia the leper problem had to be faced, so that in both these Dominions conditions were somewhat specialised.

It is, however, only when we turn to India and the Colonies, for the latter are nearly all tropical, that there is impressed upon us the fact that, until science had led the way, the physician was terribly handicapped in his efforts to cure disease, while the hygienist was also hampered and perplexed, although it is true that, by following the lines indicated by the pioneers and adopting cleanliness as his slogan, he was able to accomplish much in the way of prevention and amelioration. It was not always necessary to wait until sundry parasites had been discovered, certain vectors of disease identified, some life-cycles of lowly organisms worked out before remedying the conditions.

To do this country justice, she usually cleaned up places on which she laid her claws, at least after she had learned to keep herself clean, or, in view of present conditions, should we say fairly clean?

The Dawn of Tropical Medicine.

Yet, viewing the situation broadly, it may with truth be said that it was not until the new era of tropical medicine dawned, with its surprising revelations and its vistas of hope and of health, that any remarkable progress was made either from the purely medical or from the purely sanitary standpoint. Perhaps the most outstanding example of results following upon the heels of research is to be found in what occurred at Malta. The organism of undulant or, as it used to be called, Malta or Mediterranean Fever, had been discovered by Sir David Bruce in 1888, but itwas not until 1905–06 that a Commission of the Royal Society investigated the problem of a malady which was a veritable curse, for, though it did not kill many sailors and soldiers, it kept large numbers of them in hospital and led to prolonged disability. The loss in personnel and in money was indeed very serious. The labours of the Commission, following the lead given by Dr. Zammit, of the Malta Board of Health, who was himself appointed a member of the Commission, conclusively proved that the path of infection lay through the goat. In other words, the milk of infected goats transmitted the disease to man. Precautionary measures were at once taken, and within a year the disease had been practically eradicated from the Navy and Army.

Let it be clearly understood, however, that we must not attribute all the advance of recent years to discoveries like those of Theobald Smith on Texas Fever, Bruce on undulant fever and trypanosomiasis, Manson on filariasis, Ross on malaria, and so forth. Other factors were at work, such as the realisation of the value of the tropics as a source of raw material for the Empire, improved transport both by sea and land, improvement in the diffusion of information, greater interest in native races, the strategic importance of certain places from a military and naval standpoint, better food conditions, more comfort and a lessened consumption of alcohol. In short, the tropics in one sense became the fashion. European nations and even the United States scrambled for them and, as vested interests developed, so did the necessity of spending money and of educating the indigenous populations.

India and Africa.

Under such circumstances it is clear that India could no longer tolerate conditions like those which obtained in former times when, as Dr. Busted tells us, the white citizens of Calcutta were wont to meet after the rains under the great Banyan tree in the Maidan and congratulate themselves that they were still alive. As a matter of fact, India had already passed far beyond this stage for, as has been stated, she had been well served by medical officers and research workers, both in the Indian Medical Service and the Army Medical Service, and had benefited especially from the light thrown upon the method of spread of cholera by John Snow in London, von Pettenkofer in Munich, Bidie, Parkes, Duncan, and others in India, as well as by Koch's discovery of the cholera vibrio, the cause of the disease. Moreover, in the case of the large European cities money had not been lacking even for those Cinderellas of municipal expenditure, sanitary improvements, so that by the time research began to clear up some of the more important mysteries in tropical pathology, India was on rather a different footing from the other parts of the Empire. Whether she made the best use of her advantages in this respect is quite another question, but it must always be remembered that in India health problems are on a vast scale and that the difficulties are enormous.

Under the process of settlement and expansion the dreaded West Coast of Africa could no longer remain the white man's grave, as it had with justice been called throughout the eighteenth and much of the nineteenth century. No longer was it conceivable that the average tenure of office for Government officials should be less than 12 months. No longer was there any need for a judge to devise the ingenious expedient of making his home on a small vessel moored off the coast and going ashore only to carry out his official duties. No longer could the gravestones in the cemeteries and the memorials in churches be permitted to exhibit record after record of unfortunate persons who had perished under the age of 40. Civilisation altered the situation, and it is

worth noting that the British Empire as a civilising and colonising Power has been a good ally to health. At least, we may say that the balance is on the right side for, of course, this very process of trade expansion and settlement has resulted in terrible tragedies. Diseases have been introduced which have decimated native populations. Think of the malign influence of the slave trade in which Great Britain for so long participated, the horrible state of the slave ships in which, too often, dysentery and ophthalmia were rife, the probability that yellow fever was introduced into the New World by this iniquitous traffic. Still, when all is said and done, imperial development has, on the whole, brought about hygienic improvement, and incidentally I may say that, personally, I believe this process of "bonification," as the Italians call it, will prove the main factor in conquering such diseases as malaria and African sleeping sickness. Yet those researches to which allusion has been made, or at least some of them, had an influence apart from their intrinsic value. Once the rôle of the mosquito as the vector of the parasite of malaria had been demonstrated and the truth of Manson's malaria-mosquito hypothesis established by the labours of Ross, a wave of intense interest and of hopefulness passed over most of those associated with the tropics, though, as ever, scoffers were not lacking. There was something romantic about the idea, and the discovery seemed to hold out vast possibilities. Attention was thereby drawn to tropical latitudes and, in fact, the very controversy which arose proved beneficial. A similar and even greater outburst of enthusiasm, at least in certain circles, followed the American proof that the virus of the dreaded yellow fever was mosquito-borne, and the demonstration by Gorgas in Havana that the new knowledge had placed in our hands effective methods of prevention and control. Much the same stimulation resulted from the finding that the tsetse-fly-known to the British public from the writings of David Livingstone, was responsible for the spread of that negro lethargy or sleeping sickness, the nature of which had been for so long a time enveloped in mystery, and which had wrought such havoc on the shores of the Victoria Nyanza.

It was clear that at last we were getting to grips with those tropical maladies which had been one of the chief factors preventing the opening up of Africa and the exploiting of other regions, some of vast potential wealth, within the torrid zone.

[The lecturer then considered the home land in its imperial relationships, and pointed to the ignorance of the public, as a whole, as to the system of information whereby the Ministry of Health and the Colonial Office are notified about infected ports. He recalled the difficulties due to the country not being self-supporting in the matter of food, and finally referred to the lack of education of the public in respect of health problems. After referring to the incidence of dysentery, small-pox, and other scourges, as well as tuberculosis, malaria, and venereal disease, he closed his address with the following testimony to the value of education in hygiene and tropical medicine:]

Education in Hygiene and Tropical Medicine.

Turning now to the education of those specially charged with the preservation and restoration of health, there is a movement afoot to permeate the medical curriculum, as Sir George Newman puts it, with the preventive idea. It has made greater progress in the United States than in this country, but let us hope it will not be abandoned, for it is a sound conception, difficult of execution no doubt, but withal essential, if the doctor of the future is to be a trusted and valued ally in health campaigns. The establishment of the London School of Hygiene and Tropical Medicine marked the commencement of a new era in post-graduate public health education in this country and it has also an imperial aspect, the full significance of which will only be apparent as the years pass and more and more of those trained on new and approved principles take their places in the fighting line both in this country and overseas.

To Manson we owe the idea of special schools in England for training the medical man and woman in the control and care of diseases of the tropics or ever he or she fares foreign. London and Liverpool have done much in this direction in the past and the University of Edinburgh, always a pioneer in matters of medical education, has recently reorganised and extended its courses of instruction in tropical medicine and hygiene. An important development in connexion with the London School is the institution of courses in tropical hygiene for laymen and laywomen. Those who attend them will not enter upon tropical life unprepared and will exemplify the truth of the saying, "forewarned is forearmed."

The value of the graphic museum as a means of demonstrating all that "Health and Empire" connotes has been recognised at the London School and also at the Wellcome Bureau of Scientific Research, while it is gratifying to note that museums of this kind are springing up here and there in the Colonies where, properly conducted, they cannot fail to assist the great cause.

Hospitals for tropical diseases, like that of the Seamen's Hospital Society, play an honourable part, not only by helping the sick, amongst them many servants of the Empire, but by providing clinical material for teaching purposes and by quickening the interest of many in the welfare of our tropical possessions.

Despite the influx of medical men and women into our tropical possessions the old cry still holds good, "What are they amongst so many?" and hence we view with sympathy the extension to Africa of a system of medical training for the native which has proved its value in Ceylon, Singapore, and Fiji. This, again, is imperial work and cannot fail of its effect if only it be carefully and faithfully prosecuted, as would appear to be the case in Khartoum, where good progress is reported.

Lastly, mention should be made of the useful and widespread activities of the Royal Sanitary Institute, both at home and abroad, in the way of training and examining those desirous of becoming sanitary inspectors and thus constituting themselves links, and very valuable links, between the medical officer of health and the population for whose welfare he is responsible.

Research.

And now as to research, that much abused word and yet that weapon which, wisely wielded, has opened up and can open up for us paths in the jungle of ignorance, dispelling darkness and gloom and revealing vistas of hope and cheerfulness which, in their turn, conjure up visions of health and longevity.

In Great Britain there are many centres of research, but I will refer only to the ceaseless and ever-increasing investigations of the Medical Research Council, which have already resulted in discoveries, some of which are of vital importance to the health of the Empire. It is surely a fascinating thought, as Sir Walter Fletcher has said, that at any moment some piece of work in the laboratory or in the field in this country may profoundly influence communities existing under totally different conditions thousands of miles away. Yet it is true, and so is the converse, for research is proceeding in many parts of the British Empire. Moreover, serious efforts are being made to coördinate it. India was somewhat of a pioneer in this matter so far as research work within her own vast territory is concerned, and now the report of the Fletcher Commission has indicated further and, presumably, better lines of development. To help research in the Colonies a special Colonial Medical Research Committee has been established and is beginning to make itself felt.

Indeed, in every direction we can chronicle activity, if not marked progress, but it is necessary to sound a note of warning. Research has outstripped practice. We are not applying properly much of the knowledge we

have gained. What is the use of proclaiming new truths if we do not turn them to practical account? Unless their value is demonstrated they will become discredited. It is no wonder that scoffers still exist when, in so many places, disease holds its own simply because our hard-won knowledge is not utilised. Many examples could be cited, but I will mention one only.

Research and experience have shown the absolute necessity of laboratory aid in the diagnosis of many tropical diseases, and yet in some Colonies there exist hospitals without clinical laboratories or, if they possess some sort of a laboratory, there is no medical officer with the training or the time to utilise such facilities as do exist. A wrong diagnosis may mean the loss of a life or a prolonged illness, and at the best often means that time is lost and money is wasted. The educated layman, reading of the marvels of modern medical discovery, must himself marvel at the neglect to take advantage of them. What we want are demonstration centres here and there throughout the Empire to show what can be done when all our resources are pooled and the forces which make for disease and death are attacked from every side with every tried and proved type of medical and sanitary armament. This is not a vain dream. Something of the kind has already been attempted, notably in the United States, and the results have been striking and startling.

Again, at our training centres we want a sufficiency of staff so that, whenever required, men trained in research or in public health work will be available at short notice to proceed abroad and grapple with some problem or advise in some difficult and dangerous situation. Above all, we must continue day in day out to declare that hygiene pays and to be prepared to demonstrate the truth of that dictum.

There can be no great and lasting success unless we can count upon the sympathy and help and coöperation of all that vast community which owes allegiance to the Flag. If you would know how this may perhaps be best secured in the case of primitive peoples, read "Socrates in an Indian Village," and the other work of Brayne, an ingenious layman, on what he calls "Village Uplift."

"Health and Empire." In a short space an endeavour has been made to treat of a subject about which many great volumes might be written. It may perhaps be thought that too much time has been expended on historical considerations, but let it be remembered that unless the historical perspective be invoked it is impossible to realise the amazing change which less than a century has witnessed, to appreciate to the full the meaning of our title. When thus viewed and thus considered, surely we are led to echo some of the sayings of an ancient race which, like ourselves, knew the meaning of world-wide domination, and were, moreover, hygienists of no mean order. It was Claudian, last of the Roman poets, who spoke of health as "a deity presiding over men's affairs." It was Cicero, the Roman orator, who declared that "in nothing do men more nearly approach the gods than in giving health to men."

A GRIMSBY MATERNITY HOME.—The Grimsby Town Council intends to erect a new maternity home at Nunsthorpe at a cost of £17,500. The new building will make provision for an antenatal clinic and infant welfare centre and allow of the adaptation of the present home as staff quarters. There will be 36 beds instead of 11 as at present and five beds for septic cases, and the infant welfare centre will accommodate 80 mothers and their babies.

THE MINOR HELPS OF HOSPITALS.—At the annual meeting of the Ladies' Association of King's College it was stated that £196 was raised last year by the sale of cigarette cards. The Birthday League—the members ask their friends to contribute 4*s.* on their birthday, the amount corresponding to the cost of the hospital per minute—produced £646. The proceeds of the tin-foil collection, on the other hand, fell from £418 to £189 in consequence of the reduction in the price of metals and of many large firms now using aluminium foil in place of tinfoil.

THE ÆTIOLOGY OF DISSEMINATED SCLEROSIS.

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(WITH ILLUSTRATIONS ON SPECIAL PLATE.)

DISSEMINATED sclerosis was first described as a distinct morbid entity by Charcot,[1] who, in 1866, gave the classical account of the disease as regards its clinical manifestations and anatomical features. Since that time much work has been carried out along bacteriological and experimental lines in the attempt to discover the specific morbid factor which produces the clearly defined features characterising the disease. Many theories have been advanced, but up to the present time there has been no positive knowledge of the nature of the causative agent.

The history of the investigations carried out in this country on the ætiology of disseminated sclerosis begins with Gye's [2] work in 1913. Between 1913 and 1923 numerous workers put forward the spirochætal theory of the origin of the disease; notably Kuhn and Steiner,[3] Siemerling,[4] Marinesco,[5] and Petit.[6] In 1921 Birley and Dudgeon [7] reported uniformly negative results in an extensive research carried out with material from 35 cases of disseminated sclerosis. In 1923 Noguchi [8] gave a valuable critical review of the whole subject, and discussed the theory of the spirochætal origin of the disease. His criticism was based on experimental work which he himself had carried out, using his unique experience and knowledge as regards media, methods of cultivation, and appearances of this type of organism. He inoculated large numbers of rabbits and guinea-pigs, in practically every conceivable fashion, with completely negative results, while repeated dark-ground examination of material revealed no spirochætes. He concluded that the demonstration of spirochætes and experimental transmission of the disease to animals should be regarded as unproved. The bacteriological side of the problem has been investigated by many workers, and in particular by Dudgeon.[7] His results were completely negative, as regards both aerobic and anaerobic cultivation, whilst experimental transmission to animals was equally unsuccessful.

The question of the ætiology of disseminated sclerosis cannot be attacked as an isolated problem, but must be viewed in the light of the evidence afforded by consideration of other aspects, pathological, clinical, and serological, of the disease. Thus two important points arise in connexion with the ætiology of the disease as regards the pathological findings—namely, the nature of the process, developmental, inflammatory or toxic, and the first element to be attacked by the causal agent.

It is important to recognise that the anatomical findings point to a process localised in the central nervous system, and that no widespread reaction to the ætiological factor occurs, so far as is known, in other organs of the body. It is clear that the line of investigation adopted in attacking this problem must depend, to a certain extent, on the theory held as to whether the disease is of endogenous or exogenous origin. Thus, if the theory held by Müller [9] that the disease is due to congenital defect of the neuroglia or nervous tissue be accepted the question of ætiology resolves itself merely into a developmental problem. Congenital anomalies of development may be present in the sense that they lay the foundations of the constitutional tendency which renders the individual more susceptible to the injurious causal agent in later life by causing diminished resistance or vitality of the nervous elements. Beyond this, the assumption of a developmental genesis of the disease is insufficiently founded and hypothetical.

In the fully developed lesion, changes are evident in the myelin sheaths, neuroglia, and blood-vessels. The question arises as to whether each of the affected elements is primarily attacked by the ætiological factor or whether the process is initially parenchymatous or interstitial. Charcot [1] believed that the primary change was in the glia, and comparable to chronic interstitial inflammation in other organs, and that the changes in the myelin sheaths were secondary to this glial proliferation. Dejerine [10] and Marie [11] held that the primary lesion in the pathological process is in the blood-vessels, leading to altered nutrition of the surrounding tissue, causing degeneration of the nerve-fibres or an extension of the inflammatory process to the perivascular tissue, with subsequent or simultaneous glial proliferation. Borst [12] also advanced the theory that the causal virus circulates in the blood and causes an arteritis of the vessels with chronic inflammatory and proliferative changes, which lead to nutritive disturbances and lymphatic congestion. Redlich,[13] in 1896, put forward the view that the change in the myelin sheath is the primary lesion and of the nature of an acute degeneration, analogous to that occurring in periaxial neuritis found in toxic diseases, the changes in the glia being secondary to this parenchymatous degeneration.

In his extensive work on the histology of disseminated sclerosis Dawson [14] points out that areas of infective and toxic myelitis may be produced by various bacteria and toxins, and that these two forms of myelitis are histologically different. Thus, organismal infection is usually associated with primary inflammatory and proliferative changes in the vessel walls, while areas of necrosis with cell infiltration, and independent of vascular thrombosis, are ascribed to toxic influences, as is seen, for example, in the toxic myelitis of pregnancy. According to Dawson,[14] there is, in disseminated sclerosis, no proof of primary vascular inflammation. The first evidence of cell increase in the adventitia is an infiltration of fat granule cells consequent upon the resorptive process. The subsequent proliferation of adventitial cell elements is secondary and probably caused by this infiltration. All his histological observations lead to the conclusion that the morbid agent acts primarily on the myelin and almost simultaneously on the glia surrounding the blood-vessels. Thus the changes in an early area are much more allied to those of a toxic, rather than of an infective, myelitis. Dawson believes that primary changes in the neuroglia occurring simultaneously with the myelin degeneration are due to the action of the morbid agent itself, while secondary changes occur as the result of the primary degenerative processes. Hence his work indicates that the disease is toxic in origin, since it is admitted by most writers that areas of degeneration without cell infiltration are usually due to toxic influences, while infective agents more uniformly call forth an infiltrative form of myelitis. He concludes that primary degeneration of the myelin sheath is the most constant and uniform feature of the histological picture, and regards disseminated sclerosis as a subacute disseminated myelitis, probably due to a soluble toxin, which has a special affinity for myelin. This causal agent, he believes, is conveyed via the blood-vessels, through whose walls it must presumably pass without recognisable injury, since adventitial proliferation is completely absent in early stages before the onset of a secondary cell infiltration due to resorptive processes.

In a more recent paper on the pathological anatomy of disseminated sclerosis Symonds [15] summarises the various theories which are held as regards the nature and distribution of the cellular changes occurring in the initial phase of the disease. He points out that one group of observers believes that disseminated sclerosis is a disease of infective origin, on the assumption that there is perivascular infiltration with lymphocytes and plasma cells; while another group hold that the perivascular infiltration depicted consists of fat granule cells and therefore deny the infective origin of the disease. Symonds [15] concludes from his own histological observations that vascular engorgement and perivascular infiltration with lymphocytes and plasma cells, although not a constant feature of the lesions, may occur in the acute phases of the disease, and that the type of cellular reaction is that met with in diseases of the nervous system due to micro-organisms. He deduces, therefore, that the cause of disseminated sclerosis is probably of a similar nature.

The pathological evidence appears to establish two points: firstly, that the lesions pass through an inflammatory stage; and, secondly, that there is an agent, possibly in the form of a toxin, which has a special affinity for myelin.

A study of the clinical aspect of the disease throws little light on the subject. The disparity between the anatomical changes and disturbances of function is usually attributed to the persistence of the axis-cylinders and comparative integrity of the ganglion cells in the sclerosed area, with consequent absence of secondary degeneration. The symptoms are very varied in origin and succession, owing to the wide range and irregular distribution of the areas of sclerosis. They may be of short duration followed by a period of remission after which they, or a new series of symptoms, reappear. The clinical picture requires that the agent must be one whose influence extends over years. Intermittent evolution or activation of the morbid agent or deficient elimination have been suggested to account for the relapses which characterise the disease.

The conception of disseminated sclerosis as an infective disease was originated in 1891 by Marie,[11] who held that it arose as a sequel to acute specific fevers, such as scarlet fever or measles. Frequently it may be elicited in the history that the symptoms have followed an attack of influenza or one of the acute specific fevers, but that these are true ætiological factors does not seem possible, since the specificity of the lesions in disseminated sclerosis point to one common cause, and could not be due to infective agents of so different a nature and varied origin.

Climate, heredity, trauma, and psychical shock have been adduced as ætiological factors. It is clearly impossible that any of these can be capable of actually generating the process, although they may act as the means of lighting into activity some dormant, pre-existing, morbid condition. Similarly, cold and fatigue merely accentuate phenomena otherwise originated. It seems clear that all such factors act as predisposing causes by lowering the resistance of the body, thus allowing the final specific cause to operate.

Intoxications, endogenous and exogenous, have been suggested as ætiological factors. Endogenous toxins include not only those produced within the body by bacteria, but also those arising through abnormal metabolic processes, or as the result of deficient or abnormal secretions. Thus it has been urged that a toxin such as indol, skatol, and phenol is elaborated, and that this has a selective action on the nervous system. It is assumed that the toxin is continually re-formed, and that when lowered bodily resistance, by chills or trauma, allows sufficient concentration of the toxin, then a relapse ensues. Exogenous intoxications such as lead, copper, zinc and alcohol, and carbon dioxide have been urged as ætiological factors. These can only act as predisposing factors by the production perhaps of a toxic arteritis. Obviously there must be one specific cause, whether organismal or toxic, of disseminated sclerosis, producing the clearly defined anatomical and clinical features which characterise the disease. All these predisposing factors merely accentuate the pre-existing morbid condition determined by this specific causal agent.

The periventricular lesions which are so characteristic a feature of the disease have been considered by some observers as evidence of the toxicity of the cerebro-spinal fluid. Whether or not this is the explanation of such localisation, the study

of the cerebro-spinal fluid is of the utmost importance in the investigation of the problem of the ætiology of disseminated sclerosis. Observations on the cerebro-spinal fluid were the starting-point of the investigations which form the basis of this present research on disseminated sclerosis. In 1926 I carried out research to investigate the causation of the colloidal gold reaction in cerebro-spinal fluid from patients suffering from various diseases. It was found that in the case of disseminated sclerosis the cerebro-spinal fluid may appear normal according to the usual laboratory tests, but more often it shows two pathological changes, occurring either independently or together—namely, a positive globulin reaction in about 40 per cent., and a positive gold-curve in approximately 77 per cent. of cases. The colloidal gold test, therefore, assumes particular significance in disseminated sclerosis, since it is often the only abnormality demonstrable in the routine examination of the cerebro-spinal fluid, and it seemed probable that if the causation of this reaction were determined, valuable information would be obtained as regards the ætiology of the disease.

Experimental Investigations.

The gold test has been carried out in 189 cases of disseminated sclerosis. Seventy-seven per cent. of these gave positive gold-curves, specific curves being obtained, characterised by colour changes within certain dilution zones.

The colloidal gold was prepared by the following method: To a boiling solution, consisting of 100 c.cm. of distilled water and 1 c.cm. of a 1 per cent. solution of gold chloride, are added 9 drops of a 2·5 per cent. solution of formalin. Fifteen seconds later, 15 drops of a 2 per cent. solution of potassium carbonate are added. If necessary, a further 1 to 3 drops of the latter solution are added after an interval of 15 seconds. Not more than 18 drops altogether are added, and the solution must be kept boiling all the time. The colour change must be instantaneous. Five c.cm. of this solution should be completely precipitated in one hour by 1·7 c.cm. of a 1 per cent. solution of sodium chloride. The gold solutions used were titrated by using sodium chloride as a precipitant, according to the method described by Novick.[16] Such accurately standardised gold only was employed. Colloidal gold solutions should not be used for 12 to 24 hours after being prepared, but should not be more than seven to ten days old, since the reaction after this period becomes more alkaline, and the gold consequently less active.

The various precautions necessary in the preparation of colloidal gold solutions and the actual test are described in numerous papers on the subject, and need not be discussed in this preliminary communication. It is only necessary to point out that dilutions of cerebro-spinal fluid varying from 1/10 c.cm. to $1/10 \times \frac{1}{2^{(n-1)}}$ c.cm. in an n series of tubes, were employed in the experiments described in this paper.

The final reading should be taken 12 to 18 hours after performing the test, but frequent observations of the tubes are necessary to ascertain in which tube precipitation first occurs. The results showed that in disseminated sclerosis there is one important diagnostic point about the gold-curve revealed by such observation of the tubes—namely, that precipitation almost invariably occurs first in the fourth tube, that is, in the dilution 1/80. Whatever the final reading, this change can usually be observed within an hour of doing the test, although at first the precipitation may be very slight.

It was found that in 70 per cent. of these cases giving a positive gold-curve precipitation occurred in the dilutions 1/80 to 1/640, producing a curve of the type 00032222000. Initial and usually maximal precipitation was manifest in the 1/80 dilution. In certain stages of the disease the cerebro-spinal fluid gives a type of curve in which precipitation occurs in the first five or six tubes. In either case the degree of precipitation is usually not greater than that indicated by the figures 3 or 4. Complete precipitation is rarely seen. The type of reaction (*Verschiebung nach oben* or *Rechtsverschiebung*) in which precipitation occurs in the last two or three tubes, has been observed in two only out of the 189 cases. This reaction is usually ascribed to the protective effect of excess of albumin, but clearly this could not be the explanation in these cases, since the amount of albumin was normal.

The particular significance which the gold reaction assumes in disseminated sclerosis and its relation to other important changes in the cerebro-spinal fluid in this disease are discussed later in this paper.

It has been suggested by some observers that the gold reaction is due to the products of degeneration of nervous tissues, and is related to the result, rather than the cause, of the disease. Such a theory ignores the specificity which characterises the form of the gold-curve in various nervous diseases. These experiments showed that the gold reaction is characteristically positive in early cases before structural changes are present, also during so-called remissions, when presumably the morbid process is stationary so far as the nervous system is concerned. The gold reaction is, therefore, probably related to the cause rather than the effect of the disease, though the latter may be responsible, directly or indirectly, for a positive globulin reaction.

Although many theories have been advanced on the subject, the nature of the colloidal gold reaction in the cerebro-spinal fluid is at present unknown. The test is based on the work of Zsigmondy,[17] who showed that precipitation of colloidal gold by electrolytes could be prevented by various proteins, which exhibited varying degrees of protective action. It was applied to the cerebro-spinal fluid in 1912 by Lange,[18] whose object was to ascertain the exact nature of the substance precipitated by half saturation with ammonium sulphate. He found that certain pathological fluids, in which he had expected a protective effect, exhibited, on the contrary, precipitating properties. He introduced the test as a specific and delicate one for neurosyphilis, and concluded that the reaction was due to the presence of different proteins. Numerous other workers have thought that specific proteins were responsible for the different zonal reactions and, as Cruickshank[19] points out, obviously confuse Zsigmondy's work on protective colloids with the precipitating action of the spinal fluid. In 1917 Felton[20] stated that the reactions were dependent on the relative amounts of globulin and albumin, the globulin having a precipitating and the albumin a protective action, zonal reactions being due to the inter-relationship of the two substances. Cruickshank,[19] in 1920, also came to the conclusion that the reaction depends upon relative amounts of globulin and albumin, the globulin having a special activity associated with a positive electric charge. Mellanby and Anwyl Davies[21] concluded that the precipitating power of the cerebro-spinal fluid rests in euglobulin, and that pseudo-globulin has a protective effect on the gold.

In postulating such theories many writers appear to ignore the fact, which has been emphasised by Miller and Levy,[22] that the exact nature of the substance precipitated by half saturation with ammonium sulphate, and the precise relationship between the proteins of the cerebro-spinal fluid, normal and abnormal, are as yet undetermined.

A merely superficial knowledge of the gold test in nervous diseases would appear to render untenable the theory that the various zonal reactions depend upon different amounts of albumin and globulin. Thus a high percentage of cases of disseminated sclerosis show a positive gold-curve when no globulin can be demonstrated in the cerebro-spinal fluid, while conversely in 40 per cent. of cases of cerebral tumour, for example, there is marked excess of globulin and a negative gold-curve.

The mechanism of the colloidal gold reaction was investigated in experiments involving dialysis and electrolysis, using 380 fluids giving positive gold-curves from various types of cases. By this means electro-positive and electro-negative colloids were separated and a series of tests carried out with fluid obtained from the anode and cathode respectively.

These experiments proved that globulin so collected is quite inactive in producing a positive gold-curve. The precipitate obtained by half saturation with ammonium sulphate was separated by centrifuging, dissolved in saline, and the ammonium removed by dialysis. It was found that in fluids giving a positive Wassermann reaction the precipitate so obtained had the power resembling that of the original fluid, of giving a positive gold-curve. In fluids from other diseases, including encephalitis, disseminated sclerosis, and meningitis, in which the globulin reaction was positive, it was found that this is not necessarily the case, this power frequently being completely lost. These experiments led to the conclusion that, although in some fluids, in particular those giving a positive Wassermann reaction, the gold-precipitating substance might be attached, possibly physically, to the globulin, it has no connexion with the globulin beyond this. In most of the cases of disseminated sclerosis examined it was found that the substance precipitated by ammonium sulphate, if such were present in the fluid, could be completely removed without the gold-precipitating power of the fluid being altered. In another series of fluids giving negative gold-curves and positive globulin reactions, the precipitate obtained by half saturation with ammonium sulphate was completely inactive as regards precipitating power. Thus although it is possible that the agent responsible for the reaction may, in some cases, be associated with the substance which gives a positive globulin reaction, or may cause a specific alteration in the physical state of the globulin, yet there is no evidence in these experiments to indicate that the precipitating substance is of the nature of globulin or other protein.

These results led ultimately to the conclusion that the specificity of the gold-curve, in various diseases, can only be explained on the theory that the particular form of curve must be related to the causal factor of the disease in question. If this theory is correct, one might expect that a type of curve similar to that in the cerebro-spinal fluid might be obtained in the blood serum of the same patient, since presumably this same causal agent would be present in the blood as well as in the cerebro-spinal fluid. Observations recorded in previous work on serum in this respect appear to be of little value, for neither the time elapsing after withdrawal of the blood nor the relative quantities of the various proteins present were taken into account. In order to compare the gold-curve in the cerebro-spinal fluid with that of the serum it is necessary to dilute the amount of protein in the latter so that it becomes equal to that of the cerebro-spinal fluid. Otherwise there is another factor which will obscure the true interpretation of the experiment. As is well known, serum itself will cause precipitation of colloidal gold. The type of curve obtained by serum alone depends upon the interval elapsing between withdrawal of the blood and performing the test. Taking this factor into account, control experiments were done on normal human serum, diluted as above described. The results so obtained were compared with those in which serum, similarly treated, from patients whose cerebro-spinal fluid gave a positive gold reaction, was employed. In the latter group of cases it was found that when globulin is removed from both the cerebro-spinal fluid and serum, the filtrate gives a similar type of gold-curve. In both cases initial and maximal precipitation occurred in the same tubes, so that the type of curve produced was similar. Therefore, it was concluded that the factor responsible for the gold-curve is present in the blood as well as in the cerebro-spinal fluid, and that it is independent of the globulin in each.

Hence it seemed probable that the gold-curve in various diseases is related in some way to the causal factor, toxic or otherwise. This theory is supported by the observation that the gold reaction may be positive in the cerebro-spinal fluid in cases of syphilis even when the nervous system is not involved, and in cases of pernicious anæmia before symptoms of subacute combined degeneration are present.

It has already been pointed out, in discussing the pathological aspect of the problem, that the histological evidence is in favour of a toxic origin of the disease. These experiments on the colloidal gold reaction appeared to support this view. The question arises as to the source of such a toxin and whether, if such exists, its action can be demonstrated in any other part of the body.

In an attempt to ascertain whether such a toxin existed, an investigation of the liver functions of patients suffering from disseminated sclerosis was carried out. In 64 out of 86 cases examined, the glycuronic acid test was completely negative after the administration of aspirin. Further, in these patients there was indicanuria, the average amount of indican being 10 to 12 times the normal amount.

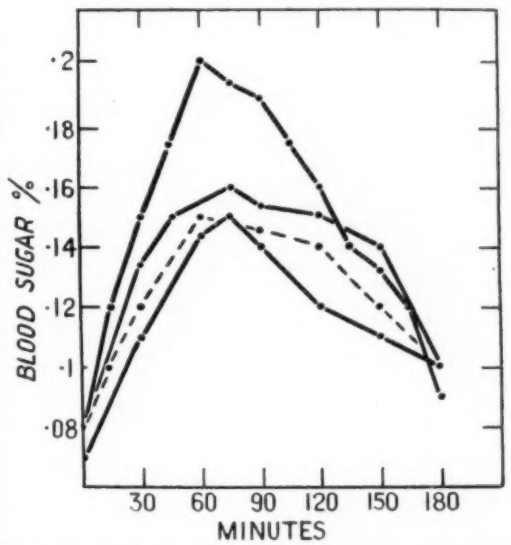

Chart showing type of blood-sugar curve obtained during lævulose-tolerance tests in patients with disseminated sclerosis.

Finally, lævulose-tolerance tests were carried out. It was found that 60 of these patients gave abnormal curves. H. MacLean's method was employed for the blood-sugar estimations which were done every 15 minutes in some cases and every 30 minutes in others, for three hours. Reference to the accompanying chart will show the type of curve obtained. It will be seen that the difference between the fasting and highest values in these curves exceeds 0·05 per cent., that the highest point of the curve is not obtained for 60 to 90 minutes, and that there is a delay in return to the original level. The results of these glycuronic acid, indican, and lævulose-tolerance tests led to the conclusion that in a high percentage of cases of disseminated sclerosis there is deficiency in the antitoxic and metabolic functions of the liver.

The question arises whether the ætiological factor is responsible for such loss of detoxicating power, or whether, owing to this deficient detoxicating mechanism, this factor is able to gain access to the body. In either case, it seemed probable from these experiments that there is a toxic factor to be taken into account in disseminated sclerosis, whether this be primary or secondary to some ætiological agent.

In discussing the possibility of the existence of autogenous or exogenous toxins, it was emphasised that none of these factors could be more than predisposing causes in the production of the well-defined clinical and anatomical picture characterising disseminated sclerosis, and that there must be some specific determining causal factor. Correlating

the evidence afforded by the histological findings of previous investigators with these results obtained by the investigation of the colloidal gold reaction and liver function tests, it appeared probable that if such a toxin existed as an ætiological factor in the disease, it must be elaborated from a specific source, and that the high degree of specificity required could only be provided by a micro-organism. This research was accordingly designed to discover whether any evidence could be obtained of the existence of such a causal agent in the cerebro-spinal fluid, or elsewhere in the body, in cases of disseminated sclerosis.

The chief argument against the theory of an organismal origin of such a toxin is that all attempts to discover an organism have, in the past, been unsuccessful. Judging by the previous work, if such an organism exists, it is difficult to demonstrate. Hence the primary aim has been to secure in every field conditions as nearly perfect as possible.

Bacteriological Investigations.

In view of the foregoing results, which show the significance of the pathological changes in the cerebro-spinal fluid in disseminated sclerosis, the importance of carrying out cultural experiments with such cerebro-spinal fluid was clear.

The initial difficulty in any such investigation is to find a suitable medium. It is not necessary in this preliminary communication to describe the numerous unsuccessful experiments carried out in attempts to culture cerebro-spinal fluid and blood from cases of disseminated sclerosis. Aerobic and anaerobic methods using various media, with and without the addition of living tissue, were employed. The results were completely negative until a trial was made with Hartley's broth to which normal human serum was added. Cultures made with this medium and human serum were negative from an ordinary bacteriological point of view, but there was evidence of some change which had not been obtained under any other conditions. Thus it was found that in certain of these experiments, carried out with Hartley's broth, serum, and cerebro-spinal fluid from cases of disseminated sclerosis, a change of reaction occurred. It was evident that the addition of both Hartley's broth and human serum was essential for the production of this change. It did not occur when any other medium was used nor when human serum was omitted from the mixture. This change of reaction was specific in that it occurred only in tubes containing cerebro-spinal fluid from cases of disseminated sclerosis. It was absent in control tubes inoculated with cerebro-spinal fluid from cases other than those of disseminated sclerosis, or containing uninoculated medium and serum.

The accompanying Table shows the results of a few illustrative experiments, in which tubes containing 8–10 c.cm. of Hartley's broth, 3 c.cm. of human serum, and 8 c.cm. of cerebro-spinal fluid were incubated at 37° C. In each case the cerebro-spinal fluid was directly received into the medium. The lumbar punctures were carried out under strictly aseptic conditions, to avoid any possibility of contamination. All the tubes in these initial experiments remained perfectly clear, and there was no indication of any change other than that described. It was concluded therefore that a definite change in reaction could be obtained under certain specific conditions, but under no other circumstances.

That an enzyme, ferment, or toxin was responsible for the change seemed improbable, in view of the fact that it only occurred when Hartley's broth or human serum were used as a culture medium.

The possibility that this change might be due to some organism was investigated by culturing and subculturing the material. Aerobic and anaerobic cultivation on solid and liquid media was employed for this purpose. The results, however, were completely negative. Hence it was clear that if anything of the nature of a living virus was present, it could not be detected by any of the usual bacteriological methods.

Thus a stage was reached when experiments showed that a change of reaction could be initiated by the addition of cerebro-spinal fluid from cases of disseminated sclerosis to a certain culture medium, but the agent responsible for this could not be

Table showing Changes of Reaction produced (a) *in Cultures of Cerebro-spinal Fluid from Cases of Disseminated Sclerosis;* (b) *Cultures to which Sugars have been Added in a Concentration of 1 per cent.*

pH of cultures of cerebro-spinal fluid.

Days.	Disseminated sclerosis.					Control. Medium + serum.	Normal.	Tabes.	Cerebral tumour.
	Culture.			Culture plus 1%—					
				Glucose.	Mannitol.				
1	7·6	7·6	7·5	7·6	7·6	7·6	7·6	7·5	7·5
2	7·5	7·4	7·4	7·52	7·6	7·5	7·5	7·5	7·5
3	7·3	7·2	7·3	7·4	7·5	7·4	7·5	7·6	7·6
4	7·1	7·0	7·2	7·3	7·46	7·4	7·5	—	—
5	7·0	6·9	7·1	7·14	7·28	—	—	7·6	7·5
6	6·9	7·1	7·02	7·0	7·12	7·4	—	—	—
7	7·1	7·25	6·89	6·85	6·9	7·4	—	—	—
8	7·25	7·4	7·1	6·66	6·72	—	7·5	7·5	7·6
9	7·4	7·5	7·2	6·52	6·5	—	—	—	—
10	7·6	7·6	7·4	6·4	6·42	7·5	—	—	7·5
11	7·7	7·8	7·5	6·55	6·4	—	7·5	—	—
12	7·8	8·0	7·6	6·5	6·4	7·5	—	7·5	7·6
13	7·8	8·0	7·8	6·5	6·44	7·4	7·6	—	—
14	7·8	8·0	7·9	6·5	6·5	—	7·5	7·5	7·5

detected. It was obvious that if an organism or virus were responsible for this change, its detection must be a special optical problem. The investigation of such a problem would have been impossible but for the assistance given to me by Mr. J. E. Barnard, F.R.S. This assistance, and the generosity of Sir James Purves-Stewart, in presenting me with certain necessary apparatus, made it possible in 1927 to employ the technique which forms the essential basis of this research.

The initial attempts to observe growth were therefore made with a microscope equipped with a dark-ground illuminator of high angle. With such an appliance it is possible to use an objective as high as 1·27 N.A. and so obtain resolution that such an optical combination will give. Any increase of optical efficiency beyond that given by such a combination of illuminator and objective is not practicable for such work, as the limiting factor is the refractive index of water, the principal constituent of all bacteriological culture media. The microscope and equipment used was made by R. and J. Beck, Ltd., and consisted of their "Massive Microscope," together with a 2 mm. apochromatic objective of 1·2 N.A. and a dark-ground illuminator designed to work with such an objective. This apparatus was regarded as the most efficient that could be obtained for the purpose in view, and is an exact reproduction of that used by Mr. Barnard for similar dark-ground observations.

The source of light is a mercury-vapour lamp made by Kelvin, Bottomley and Baird. This lamp is not subject to appreciable changes of luminosity as it readily adapts itself to any reasonable voltage variations on the supply circuit. This is a point of some importance in microscope work where bodies are to be observed which are of low visibility, and are near the limits of resolution. Monochromatic green light is obtained by the use of a didymium glass screen, which ensures that only the green line in mercury ($\lambda = 5461$) is transmitted, the remaining lines at least being too faint to take any part in the formation of the image. All objectives are highly corrected for this region of the spectrum, and further, it is that portion to which the eye is most sensitive. It follows, therefore, that observations can be made with a small amount of light energy, so that any possibility of damage to living material is eliminated.

Method of Cultivation.

It has already been emphasised that under no circumstances was any visible growth ever obtained on solid media. It was, therefore, essential to use a method whereby the surface of serum-agar could be examined with a 2 mm. oil immersion objective. The method employed is that dev sed by Welch.[23]

In this, colonies of any organism on solid media can be observed by a means ordinarily used for the detection of organisms themselves. The procedure is as follows :—

Into a 7 in. by 1 in. test-tube are introduced three glass slips (No. 2 cover-glass size) in the form of a triangle. These three slips support one another and rest on a ring of glass at the bottom of the tube. About 20 c.cm. of 2 per cent. nutrient agar (made with Hartley's broth) is put into the tube, reaching to the lower end of the slips. The agar is melted by placing the tube in a boiling water-bath. It is allowed to cool to 40°–45° C. A mixture of cerebro-spinal fluid and serum at a temperature of 40° C. is then added to the liquid agar. The tube thus inoculated is rotated between the hands to ensure efficient mixing. It is then tilted so that the inoculated medium flows over the surface of the slips. This is repeated three or four times. In this way each slip is covered by a thin layer of inoculated medium. The thickness of the agar layer depends on the temperature at which the procedure is carried out and on the number of times the tube is tilted. The tube containing the three slips is incubated at 37° C. When it is desired to examine a slip, one is withdrawn with sterile forceps. A cover-glass is placed on the agar layer and luted with melted paraffin wax. The serum-agar medium usually has sufficient moisture to secure optical contact between the cover-glass and agar layer. The agar adhering to the edges and back of the slip is removed. The slip is put in a slip-holder and is then ready for microscopical examination. The remaining two slips can be left in the tube for further incubation if desired.

The advantage of this method is that observations are made on thin layers of nutrient medium, and it is therefore possible to see at any stage of growth, whether isolated organisms or young colonies, if single organisms are too small to identify, are developing.

Staining in any form or by any process has been avoided for several reasons. In the first place, it appeared essential to examine material in the living state if results of any value were to be obtained. Secondly, it was feared that artefacts due to staining would obscure the true picture. Finally, it was evident that if anything of the nature of a virus was present, it must be so small that staining methods would be of no value. Such methods might indeed destroy the only recognisable characteristic such a body might possess—namely, the difference there might be in optical qualities between it and inert particulate matter, in virtue of which it might be seen under certain conditions.

The use of the method described necessitates prolonged study of uninoculated media. Extensive observations were carried out along these lines before the technique could be employed for this work. In this connexion I am particularly indebted to Mr. Barnard through whom I acquired the knowledge necessary for the detection not only of artefacts but also of contaminants which so frequently are seen when using dark-ground illumination. The source of error due to filtrable contaminants was reduced to a minimum by inoculating the cultures in a sterile chamber designed by Mr. Barnard. In this, ultra-violet light from a quartz mercury-vapour lamp falls directly upon all the interior surfaces, and the ventilating air enters as the warm air in the neighbourhood of the lamp ascends and passes out on that side of the box where the experimenter works. This device provides a sterile atmosphere in which cultures can be inoculated, whereas the experimental material, being enclosed in glass culture tubes, is protected against bactericidal radiations.

Using the technique described, material could be examined either in liquid cultures or on solid medium by making slip cultures.

Microscopical Observations.

Observations carried out according to this technique showed that slip cultures of cerebro-spinal fluid from cases of disseminated sclerosis exhibit the following characteristics when examined with a 2 mm. objective, using dark-ground illumination. A slip examined after 24–36 hours' incubation at 37° C. shows small groups or colonies of spherical bodies, some of which appear to have small refractile granules attached to them. There may be one or more granules on one sphere. At a slightly later stage many single spheres with and without granules can be seen. The appearance of these spheres and the colonies which they form is absolutely characteristic when seen under the microscope. Apparently these refractile granules gradually move away from the spheres. Occasionally a fine filament can be seen between a granule and sphere.

Microscopical examination of cultures at varying intervals of time showed that the spheres multiplied during incubation at 37° C. This phase is particularly marked 24 to 36 hours after initiation of the culture. One of the advantages of the slip method employed is that successive stages of growth can be observed. Thus, if slips are examined at daily intervals it will be seen that after 12 to 24 hours' incubation colonies composed of groups of spheres and granules are present. (See Figs. I. and II. (magnification ×1400 in each figure)). After 48 to 72 hours colonies on a slip from the same tube are seen to have increased in size, and many spheres and granules can be seen. Finally, after seven to ten days large degenerating colonies can be seen. (Fig. III.) As the age of the culture increases there is diminution in the visibility of the spheres.

It must be pointed out that the characteristic appearance can only be obtained with certainty when the slip method is used. It is essential to keep such cultures, grown on a thin layer of agar, moist. A rubber cap may be placed over the top of the tube to prevent evaporation during incubation. If the slips are allowed to dry, the microscopical appearance is completely spoiled. The best way of obtaining reliable results is to let the culture grow on the agar-coated slips for 24 to 36 hours and then fill the tube up to the level of the top of the slip with a mixture of broth and serum, and continue incubation. Grown in this way there is no danger of the slips drying and the colonies have a plentiful supply of medium. The colonies develop freely and free spheres and particles may be observed in the fluid medium.

It was found that subcultures could be effected by using fresh tubes of Hartley's broth and serum. In such subcultures the spheres multiplied, and the same characteristic appearance could again be obtained on solid medium by making slip cultures from these subcultures.

In view of the fact that multiplication in vitro and subcultures could be effected, the possibility that the appearances described in these cultures are due to a living virus was considered. That such bodies as described are characteristic of a type of living organism is evident from the study of bovine pleuro-pneumonia.[24] The microscopical appearance is similar, but differences in detail can be observed after careful and prolonged observation. It is admitted that bodies do appear on occasions in uninoculated tubes that have some points in common with both pleuro-pneumonia and the organism observed in disseminated sclerosis cultures. There is reason to regard these as filtrable contaminants, but they can be microscopically differentiated from the cultures herein described, and further they develop best at different temperatures and in different times. By analogy, therefore, there is reason to regard the results obtained in culture as being suggestive of the growth of a living virus, although it is admitted that much has yet to be done before a full and satisfactory understanding of the complete life-cycle can be worked out.

Conditions Affecting Growth.

Experiments were carried out to determine the conditions affecting the growth of cultures. Cultures were incubated, aerobically and anaerobically, at various temperatures. It was found that aerobic cultivation was essential and that cultures are more sensitive to high than to low temperatures. They do not survive a temperature of 55° C. for more than a few minutes, nor one of 50° C. for longer than 30 minutes. Cultures which are actively growing can withstand a temperature of 0° C. This has the effect of inhibiting growth without actually destroying

cultures. They are killed by a 0·5 per cent. solution of carbolic acid, and are inhibited by 5 per cent. solution of glycerol.

The cultures are excessively sensitive to changes in reaction. This sensitivity is one of the difficulties of cultural experiments. The pH of the medium must be not greater than 7·6 or less than 7·5 when cultures are initiated.

It has already been emphasised that no growth visible to the eye is ever present in solid or liquid cultures. Slight opalescence is frequently seen in liquid cultures. This is probably due to changes occurring as the result of growth.

The early experiments already described in this paper demonstrated that a change of reaction occurs when cerebro-spinal fluid from cases of disseminated sclerosis is cultured under certain conditions. This experimental observation was now more fully investigated. It was found that in an actively growing culture the production of acidity is progressive until about the fifth day, and then an alkaline reversion begins. Reference to the Table, illustrating a few of the experiments carried out in this connexion, will show the type of results obtained. Although a pH of 7·6 is essential for the initiation of a culture, yet when a certain stage of the culture is attained growth can be maintained, even though the pH has fallen to 7·0. All the pH determinations in this work have been carried out by the electrical method, using a hydrogen electrode. The cause of the production of acidity, and subsequently alkalinity, has not been fully ascertained. That it is a direct result of the growth of the virus is proved by the fact that it occurs only in actively growing cultures, but the exact mechanism of the change remains a problem for future investigation. The results of these experiments, however, were regarded as additional proof that the appearance seen in cultures can only be due to a living virus.

Important confirmatory evidence of this conclusion was obtained by experiments in which sugars were added to cultures in various stages of their development. There are particular difficulties in carrying out sugar reactions in this work. The first, and most obvious, is that the usual sugar reaction medium (peptone water) cannot be used, since the virus will only grow in a mixture of Hartley's broth and serum. It was ascertained that the latter were sugar-free, and careful comparison with controls was, of course, necessary. The interpretation of the tests with glucose depends essentially on such controls, for there is the additional factor of a glycolytic ferment in the serum to be taken into account. The possibility of the influence of such a ferment in cerebro-spinal fluid can be avoided by subculturing and using subcultures for the experiments. This method, however, does not overcome the difficulty in the case of serum, since it is necessary when making a subculture to add human serum. The glycolytic ferment might be destroyed by heat were it not for the fact that serum so inactivated is unsatisfactory for cultures. Hence the only way in which the test can be carried out in the case of glucose is by comparing the results with carefully made controls. In such control tubes slight breakdown of the sugar, with consequent slight increase in acidity, occurs. The extent of this change is not comparable with that occurring in the cultural experiments.

The sugar solutions used were sterilised by filtration through Berkefeld filters to avoid sterilisation by heat. The sugar was added to the culture so that it was present in a concentration of 1 per cent. The indicators used in this work were bromcresol purple (pH 5·2 to 6·8), bromthymol blue (pH 6·0 to 7·6), and phenol red (pH 6·8 to 8·4), but for accurate determination of the changes, the electrical method for determination of hydrogen-ion concentration was employed.

In no case was any gas formation observed, but in the cases of glucose, fructose, and mannitol there was production of acidity. The reaction of cultures to which glucose has been added begins to change in 12 to 24 hours. In the cases of mannitol and fructose no change of reaction is apparent until 36 to 48 hours, or even longer, have elapsed. A pH of about 6·5 is ultimately reached, seven to ten days after the initiation of the experiment. The reaction then remains stationary and there is no return to a more alkaline reaction, as occurs with living cultures. The Table illustrates these points.

If at the end of the fifth day, when reaction is about 6·9, cultures are examined microscopically, they will be found to be negative, and no growth can be obtained in subcultures. Therefore, although the virus itself may be responsible for the initial changes in the process it cannot produce the ultimate result, and further change of reaction must be due to some other factor.

Detection of the products of fermentation remains a problem for future research. It is obviously complicated by the fact that the virus itself induces changes in the medium, as evidenced by the changes of reaction in cultures, already described.

It may be mentioned in this preliminary communication that in no case could the original glucose, fructose, or mannitol be recovered from the cultures in which this production of acidity occurred.

Filtration.

It has already been indicated that various stages of development can be observed in slip cultures examined at varying intervals of time. An attempt was now made to determine whether the appearances observed were stages in the life-cycle of a virus. For this purpose filtration experiments were carried out. In view of the inadequacy of ordinary filtration methods, ultra-filtration has been resorted to. Until recently no method of standardising filters in quantitative terms had been evolved, so that the definition of what is meant by a filter-passer is uncertain. It has been pointed out by numerous workers that filtration through filters of the Berkefeld or Chamberland type is unreliable. A filter is not a mere mechanical sieve, and several factors other than the size of the filter-pore determine whether a given body will pass through it, and influence the results of filtration experiments. In this research collodion membranes have been used with a known size of pore, this being determined by the concentration of collodion used in the production of the membrane. These collodion membranes were kindly supplied by Mr. Elford, working at the National Institute for Medical Research. The method of preparation of membranes and the technique employed are described in a paper by Elford.[25] These ultra-filtration experiments are as yet incomplete, and will form an important part of future investigations. It may be mentioned in this preliminary communication, however, that when a certain grade of membrane was used, it was found that the filtrate contained granules only. The filtrate so obtained was inoculated into serum-broth, incubated at 37° C., and from this culture 24 hours later slip-cultures were made in the usual way. In such slip-cultures the characteristic appearance of spheres and granules was obtained 24 to 36 hours later. The inference drawn from these preliminary experiments is that spheres can be produced from the granules in cultures.

The correlation of these various experimental results led to the conclusion that, under certain conditions, a living virus can be cultured from the cerebro-spinal fluid from cases of disseminated sclerosis. The cerebro-spinal fluids of 188 cases of this disease have been cultured and examined in this way. In 176 of these cultures the characteristic appearance described was observed. These cases included patients undergoing a so-called spontaneous remission occurring in the course of the disease, as well as those stationary or clinically advancing. Hence this appearance was specific in that it could be demonstrated in such cultures, but was invariably absent in controls.

Many samples of uncultured cerebro-spinal fluid from these patients have been examined according to the microscopical technique described, but in no case have any spheres or particles ever been observed. This may be because the virus is not present in sufficient quantity, or exists in some form which

cannot be seen by such a method. It may be due to lack of optical contrast between the virus and its surroundings, that is, to insufficient difference of refractive index between the virus and the medium in which it is immersed. Cultures of the blood serum of such patients have been uniformly negative, and if at any stage of the disease the blood be infective, such a stage has not been detected in this work.

Cultures of cerebro-spinal fluid from 269 control cases have been examined by this method and proved to be completely negative in this respect. These control cases include normal cases, hysteria, tabes dorsalis, cerebro-spinal syphilis, subacute combined degeneration of the cord, transverse myelitis, spinal compression, epilepsy, cerebral tumour, and encephalitis.

As regards the method of cultivation, it has been emphasised that reliable results can only be obtained by the use of normal human serum. Serum from patients suffering with disseminated sclerosis cannot be used for this purpose. Such serum cannot be described as being inhibitory to the growth of the cultures, but simply acts like any other unsuitable serum, such as that of goats, rabbits, monkeys, and guinea-pigs. Horse serum can be used as a substitute, but it is unsatisfactory. The cultures take much longer to develop, and the only reliable way in which characteristic cultures can be obtained is to use normal human serum.

In the preparation of cultures, it is preferable to receive the cerebro-spinal fluid directly into the culture medium. If this is not done, the time elapsing between withdrawal and culturing of the fluid must be very short, otherwise growth cannot be obtained in cultures. In this connexion it may be mentioned that transference of the material, either before culturing or before microscopical examination of the cultures, is very undesirable. Such a procedure leads to unreliable and inconstant results, although the reason for this is not, at the moment, perfectly clear.

The cerebro-spinal fluid must be withdrawn under strictly aseptic conditions. Unless particular care is exercised in this respect bacterial contaminations, which so easily occur, not only obscure the microscopical appearance but prevent growth of the virus and so render the culture useless.

It was recognised that if the virus described is the causative agent of disseminated sclerosis it might presumably produce a specific effect on myelin. Such an action might be due to the virus itself or the result of some product of the virus. The investigation of this possibility has been carried out by Dr. Hocking, and is described by him in a paper which follows.

It has already been pointed out that there is evidence of a toxic factor in disseminated sclerosis. In discussing the significance of the results which led to this conclusion, it was emphasised that if a toxin exists as an ætiological factor, it must be elaborated from a highly specific source, in view of the clearly defined clinical and anatomical features characterising disseminated sclerosis. The question arises what is the relationship of the virus to this toxic factor. Evidence that such a relationship exists is afforded by a study of the cultural properties of the cerebro-spinal fluid and its capacity to produce a positive gold reaction. Thus it has been found that in all cases of disseminated sclerosis, in which colloidal gold test was positive, the virus could be cultured from a sample of cerebro-spinal fluid taken simultaneously. It has been found that if on a subsequent occasion a sample of cerebro-spinal fluid from the same patient yielded negative cultures the gold-curve had also become negative. This observation was confirmed so often that it must be concluded that there is some relationship between the factor responsible for the precipitation of colloidal gold and the presence of the virus in cultures of cerebro-spinal fluid. It is evident that this factor cannot possibly be related directly to the presence of the virus. Cerebro-spinal fluid will, of course, precipitate colloidal gold many hours after withdrawal when it can no longer be used to obtain cultures of the virus. Neither is the converse relationship necessarily true, for the gold test may be negative in cerebro-spinal fluid from which positive cultures can be obtained. Hence, although a correlation of the colloidal gold reaction and cultural results shows a definite connexion in this respect, the precise relationship has not been determined. It is conceivable that the factor responsible for precipitation of the gold results from some product, toxin or otherwise, of the virus. This possibility will be investigated in future research.

An attempt has been made in this preliminary communication to show how the problem of the ætiology of disseminated sclerosis was investigated in the light of the evidence provided by the histological observations of previous workers, and that afforded by the results of the colloidal gold and liver function tests carried out in this research. A simple experiment, designed to discover whether or not anything of the nature of a living organism was present in cultures of cerebro-spinal fluid, gave important results which suggested that such might be the case. The correlation of these experiments led to a fuller investigation of the subject, and to the use of a method which previously had not been employed for the examination of material from cases of disseminated sclerosis. A characteristic appearance, specific in that it can be obtained only in cultures of cerebro-spinal fluid of cases of disseminated sclerosis, is seen by employing a certain technique.

The following experimental observations support the theory that this appearance is due to a living virus.

1. Multiplication in vitro occurs.
2. Subculturing can be effected.
3. Sensitivity to hydrogen-ion concentration, temperature, and certain chemical agents is manifest.
4. Sugar reactions, at least in their initial phases, are induced by actively growing cultures, although subsequently they may be due to some other factor.
5. Changes in the hydrogen-ion concentration of the medium results from, and is associated with, growth of culture.

It will be evident that the appearance of the cultures described bears a striking resemblance to the organism which is regarded as the causative agent of bovine pleuro-pneumonia. The latter is of particular interest because it appears to be a connecting link between ordinary bacteria and those known as filtrable viruses. Pleuro-pneumonia is the smallest organism known to grow under ordinary bacteriological methods of cultivation. It is a small particulate body of about 0·2 μ diameter. The particulate form is accompanied by and is dependent for its reproduction on a larger spheroidal body which develops from the particulate form.[26] The results embodied in this paper have led to the conclusion that a similar sequence of events is to be observed in cultures of cerebro-spinal fluid from cases of disseminated sclerosis. In both cases varying phases occur, the small granular form being associated with other bodies of essentially different characters.

Except for the virus of pleuro-pneumonia, cultivation of filtrable viruses has not yet proved possible in the absence of living cells. It is clear that until cultures can be made in an artificial medium and separated from cellular material, progress in their study is hindered by the presence of many uncontrollable and undetermined factors. In this research, however, such conditions have been more nearly attained, since it is necessary to add human serum only to the medium.

It has been suggested by many authorities that filtrable viruses are not of the nature of living organisms, and that enzymes or ferments may produce the observed results. Power of multiplication alone is not necessarily proof of life, neither is sensitivity to hydrogen-ion concentration or temperature. No organism belonging strictly to the group of filtrable viruses has yet been observed with sufficient accuracy to enable a description to be given of its cultural and morphological characteristics. It would appear, however, that a study of the virus described in this paper

affords proof of the existence of a body less than 0·2 μ diameter which is actually living. Not only can it be cultured in an artificial medium comparatively free from cells, and be observed by a certain microscopical technique, but it apparently goes through a definite life cycle and exhibits specific cultural characteristics. Hence the importance of this virus lies not only in relation to the ætiology of disseminated sclerosis but to the problem of filtrable viruses, and its study offers a prolific field of research.

I am deeply grateful to Mr. J. E. Barnard for his invaluable assistance, and I take this opportunity of thanking his staff, in particular Mr. F. V. Welch, for coöperation and help.

I wish to record my gratitude to Sir James Purves-Stewart for his personal gifts to myself of the special microscope and other apparatus, and for the supply of clinical material. A request from Sir James Purves-Stewart that I should investigate the problem of the causation of disseminated sclerosis was responsible for the initiation of this research.

The photomicrographs, which accompany this paper, were taken by Dr. D. F. M. Hocking, to whom I am indebted not only for all the photomicrographs taken of cultures but for much valuable advice throughout the work.

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HOSPITAL COSTS.—The cost of food for the patients and staff of Bradford Royal Eye and Ear Hospital last year was approximately 10½*d.* per day.—At the Hants County Hospital, Winchester, the average cost of in-patients per day was 8*s.* 10*d.*, an increase of 5*d.*; the average total cost of each in-patient was £9 5*s.* 4*d.*, a fall of 2*s.* 1*d.*—At the Ockenden Convalescent Home, Torquay, last year, the average weekly cost of maintenance of inmates was 14*s.* 8*d.*

A SPECIFIC VACCINE TREATMENT IN DISSEMINATED SCLEROSIS.

BY SIR JAMES PURVES-STEWART, K.C.M.G., C.B., M.D. EDIN., F.R.C.P. LOND.,
PHYSICIAN TO WESTMINSTER HOSPITAL.

FOR many years some clinicians have recognised the probable existence of a specific organism as the cause of disseminated sclerosis and have been awaiting the identification of such an organism. Moreover, the characteristic histological changes in the nervous system, admirably described by Dawson[1] and others, have pointed so strongly to an infection by some blood- or lymph-borne organism that its discovery, sooner or later, was only a question of time.

On several occasions false hopes have been raised. For example, so long ago as 1913 Bullock[2] (now Gye) claimed to have induced paralytic phenomena and spinal cord degenerations in rabbits, 12 to 21 days after subcutaneous injection of cerebro-spinal fluid from a case of disseminated sclerosis. He suggested that the disease was due either to a filter-passing organism or to a water-soluble poison in the cerebro-spinal fluid. Further observations by this author[3] in 1921 led him to the same conclusions, although no organism was then identified.

In 1917 Kuhn and Steiner[4] described the presence of a spirochæte in the blood of a group of guinea-pigs which had become paralysed after inoculation with blood and cerebro-spinal fluid from a patient suffering from disseminated sclerosis. They produced no histological evidence, however, that the paralytic symptoms in these animals were those of disseminated sclerosis. In 1919 Marinesco,[5] after intracerebral, intraspinal, and intraperitoneal inoculation into guinea-pigs of cerebro-spinal fluid from a case of disseminated sclerosis, observed in two animals out of six the presence in the cerebro-spinal fluid of spirochætes similar to those described by Kuhn and Steiner; moreover, the animals subjected by him to intracerebral injections showed symptoms of mild paresis of the hind limbs within a few days. But a subsequent series of similar inoculations with cerebro-spinal fluid, from the same human patient as before, gave completely negative results.

Further evidence adduced by Rothfeld, Freund, and Hornowski,[6] and by Birley and Dudgeon[7] indicated that these spirochætes, occasionally observed in the blood or cerebro-spinal fluid of experimental animals, were in no way specific, but were probably derived from some other accidental source, unconnected with the malady of disseminated sclerosis. Noguchi[8] goes so far as to suggest that the spirochætes described by Kuhn and Steiner were probably only delicate filaments derived from red corpuscles, which filaments, seen by Noguchi himself by dark-ground illumination, are readily misinterpreted as spirochætes.

My colleague and former pupil, Miss Kathleen Chevassut, after pursuing for a time biochemical studies on the cerebro-spinal fluid in the research laboratories of Westminster Hospital, had the good fortune to come under the inspiration of Mr. J. E. Barnard, F.R.S., head of the Department of Applied Optics, National Institute of Medical Research, with the result that by certain methods which she describes in an accompanying paper she succeeded in culturing from the cerebro-spinal fluid of one of my patients what we regard as a causal organism. To this virus we propose to apply the name of *Spherula insularis*.

Clinical and Experimental Observations.

During the last two years, in conjunction with Miss Chevassut, I have investigated for the purposes of this research 189 cases of disseminated sclerosis. In 176 of these—i.e., in over 93 per cent. of cases—the specific organism has been successfully cultured by her from the cerebro-spinal fluid. A control series of 269 cases has also been similarly examined in normal individuals and in patients suffering from

other maladies, including tabes, tabo-paralysis, poliomyelitis, encephalitis epidemica, cerebral and spinal tumours, epilepsy, hysteria, subacute combined degeneration, myelomalacia, amyotrophic lateral sclerosis, and cerebral syphilis. In every instance these have failed to yield the organism. This series is sufficiently large, we believe, to show the constancy of the organism in disseminated sclerosis and to place its occurrence beyond the category of mere coincidence.

The virus is equally demonstrable in early and in advanced cases of the disease. It is more abundant, as would be expected, in cases which are in an actively progressive stage. The technique of its demonstration, as described by Miss Chevassut, requires special optical apparatus, together with a culture medium of peculiar delicacy. In three cases of straightforward disseminated sclerosis, where the patient had recently been under treatment by arsenobenzol or other arsenical preparations, our first attempt at culture from the cerebro-spinal fluid proved negative. But after keeping such patients for a few weeks without arsenic, later examination succeeded in growing the organism. This is in accordance with the clinical improvement which occasionally follows arsenical treatment of the disease.

In temporary conjunction with Dr. Braxton Hicks and Dr. F. M. Hocking in the John Burford Carlill laboratories of Westminster Hospital, we have also carried out experimental inoculations of cultures of the organism upon a series of seven monkeys, both by the intravenous and the intracisternal route. The results of these and other observations form the subject of a separate paper.[1] Incidentally, however, it may here be mentioned that one of our monkeys, inoculated intravenously, developed paralytic symptoms and in this particular monkey the spinal cord showed well-marked Marchi degeneration in one posterior column and in one direct cerebellar tract. In a second monkey, without paralytic symptoms, there was degeneration in one antero-median column, together with a few scattered fibres of degeneration in both lateral columns.

An Autogenous Vaccine.

Miss Chevassut, at my request, proceeded to use the cultures described by her for the preparing of an autogenous vaccine. We have observed its effects, clinical and serological, upon a series of disseminated sclerosis cases, 128 in number; 70 of these have remained under observation for periods long enough to give us an idea of the results produced.

In order to eliminate the possible factor of protein shock, Miss Chevassut has prepared the vaccines in normal saline solution, free from all protein substance. It is important that the cultures of the virus should be killed, not by heat, but by the addition of 0·5 per cent. carbolic acid solution. It is further of importance that the vaccine should be prepared from an actively growing early culture and that the culture should not be filtered. Finally, in standardising the vaccine (which is achieved by counting under the microscope) the important factor is the number of granules (not spheres) which are present.

To Miss Chevassut and myself it seems improbable that the reaction produced by the vaccine is in any way an affair of complement-fixation. Nevertheless, as a result of vaccine treatment, the serum of certain patients has been observed to acquire viricidal properties. This is in harmony with the consensus of opinion in recent years that filtrable viruses have the power of stimulating the production of antibodies, although the mechanism of their formation is at present obscure. Schultz,[9] Levaditi and Nicolau,[10] Andrewes,[11] and others, are of opinion that the response elicited by viruses is fundamentally different from that elicited by ordinary bacteria. The theory has been suggested that ultra viruses may stimulate the production of antibodies which inactivate the virus, without the aid of complement, by a process of simple neutralisation.

Observations on the serum of certain of our patients support such a view. Thus in certain cases, after vaccine treatment, the patient's blood-serum, when added to a culture from his own cerebro-spinal fluid, inhibits, either completely or partially, the growth of the virus. It has already been pointed out in Miss Chevassut's paper that the serum of patients already suffering from the disease is unsuitable for cultures of the virus. This, however, is not a true inhibitory effect. On the other hand, in the case of patients who are undergoing a true remission with clinical improvement, as a result of vaccine treatment, the serum has acquired a totally different property and is now inhibitory to the growth of the virus. We would point out that this viricidal property of the serum is highly specific. In 27 cases out of 32 it has been found that when the serum acquires such a property it is inhibitory only to the virus cultured from the patient's own cerebro-spinal fluid. It is possible that subsequent research will show that various strains of this virus exist. If large numbers of cultures were tested with this rarely produced inhibitory serum it is also conceivable that such serum may prove to be inhibitory to many cultures—i.e., to be polyvalent.

Concomitantly with the disappearance of the organism, the clinical signs and symptoms in each case have come to a standstill, leaving behind, as might be expected, a certain residuum of physical signs, depending on the amount of permanent damage already inflicted upon the central nervous system.

In three cases we have supplemented the vaccine course by the adminstration of the inhibitory serum. This part of our work will be the subject of further investigations.

The difficulties of estimating the true value of vaccine treatment are increased by the well-known tendency of disseminated sclerosis to undergo spontaneous remissions. This fact must make one cautious in attributing clinical improvement to any particular form of treatment which may happen to have preceded the remission. Several patients have come under observation during such a stage of spontaneous remission, but in these cases we have always found that the cerebro-spinal fluid shows the usual positive gold-curve and globulin reaction and that it contains the organism. On the other hand, when a true therapeutic remission occurs as a result of vaccine treatment the cerebro-spinal fluid loses its pathological serological reactions and no longer yields a positive culture of the organism. The following figures will illustrate this fact.

Case.	Treatment.	Colloidal gold reaction.	Globulin reaction.
A	Before treatment.	4433220000	Positive.
	12 Doses	3333310000	Negative.
	24 autogenous	2223000000	,,
	36 vaccine.	0000000000	,,
B	Arsenic treatment.	0033322000	St. positive.
	12 Doses	0001221100	Positive.
	24 autogenous	1122000000	Negative.
	36 vaccine.	0000000000	,,
C	Arsenic treatment.	4334321100	Positive.
	Vaccine for 3 months	1223000000	,,
	6 ,,	0000000000	Negative.
	No treatment for 6 ,,	0000000000	,,
	12 ,,	0000000000	,,
D	Before treatment.	0123300000	Positive.
	Vaccine for 3 months	1112200000	,,
	6 ,,	0000000000	Negative.
	No treatment for 6 months.	0000000000	,,
E	Before treatment.	0034330000	Positive.
	Vaccine for 3 months	1123000000	Negative.
	6 ,,	0000000000	,,
	9 ,,	0000000000	,,

St. = strongly.

Cases illustrating Results of Vaccine Treatment.

Let me now quote several illustrative cases:—

CASE 1.—A girl of 16, singularly tall and well developed for her age, noticed, two years ago, weakness of the right wrist when playing tennis, so that she had to give up the

[1] This paper will be published next week.—ED. L.

game. Later, when fencing, she found the right wrist weak. A bone-setter and an osteopathist were consulted in turn, without benefit. The weakness gradually affected the whole of the right upper limb, so that she became unable to write for more than two or three minutes at a time and used to drop things occasionally from the right hand.

On examination on March 15th, 1928, she was a tall, muscular girl, who had moderate weakness of the right upper limb at all joints. The optic discs, pupils, and cranial nerves were normal; there was no nystagmus. There was no sensory loss to any form of stimulus. The lower limbs were powerful. The supinator-jerks, knee-jerks, and ankle-jerks were normal. The plantar reflexes could not be elicited, but subsequently proved to be flexor in type. The abdominal reflexes were absent, both upper and lower. The cerebro-spinal fluid contained 1·4 lymphocytes per c.mm., gave a faint globulin reaction with negative Wassermann and gold-curve. Cultures yielded a positive growth of the *Spherula insularis*.

A series of autogenous vaccines was given intravenously at weekly intervals as follows: 1, 3, 5, 7½, 10, 15, 20, 25, 50, 75, 100, 150 millions. At the end of this course the right upper limb remained weaker than the left at all joints and there was slight clumsiness of the right fingers. The plantar reflexes were indefinite in type, but the abdominal reflexes had now returned and were equal on the two sides. Cultures from the cerebro-spinal fluid still yielded the organism. Accordingly a second series of vaccines was given as follows: 50, 75, 100, 150, 170, 200, 250, 300, 375, 450, 500, 600 millions. The last two or three of these vaccines produced temporary tingling in the right forearm and hand, together with temporary increase in the weakness of the limb, lasting a day or two. When re-examined on Dec. 5th, 1928, the right grasp was still weak, as compared with the left; there was no other motor disability. The plantar reflexes were flexor in type; the abdominal reflexes were again absent. The cerebro-spinal fluid no longer yielded the organism on culture, whilst the patient's blood-serum was now found to be inhibitory to the growth of the spherula.

Five c.cm. of the patient's own blood-serum were accordingly injected intrathecally. This produced an unusually severe meningeal reaction with a marked polymorphleucocytosis of over 4000 cells per c.mm., the cultures meanwhile remaining sterile. After four days all the meningeal symptoms cleared up and the cerebro-spinal fluid was again normal, save for a slight lymphocytosis, amounting to 10 cells per c.mm.

When re-examined on May 27th, 1929, the weakness of the right upper limb had completely disappeared and she was now playing tennis and other games normally. No unsteadiness of the limb was now to be detected. The supinator-jerks, knee-jerks, and ankle-jerks were normal as before. The left plantar reflex was flexor; the right could not be elicited. The upper abdominal reflexes were still absent; the left lower abdominal reflex was present; the right was absent. The cerebro-spinal fluid contained 10 lymphocytes per c.mm., with 0·04 per cent. of albumin. The globulin reaction was now negative, so also was the gold reaction. Cultures no longer yielded the organism.

In this case the clinical symptoms and signs were so mild, consisting merely in weakness of one upper limb with loss of the abdominal reflexes, that had one not examined the cerebro-spinal fluid and demonstrated the organism, the true nature of the malady might have been overlooked.

CASE 2.—A married woman of 34 came under observation on Dec. 5th, 1928, complaining of weakness of the right arm and leg; 13 years previously, at the age of 21, she had transient weakness of all the limbs with inability to walk for a week. She then remained well until ten days ago, when she woke up with a fresh attack of weakness of the right arm and leg, accompanied by subjective tingling of the right fingers. There was no visual or bladder trouble.

On examination she was an intelligent woman of spare nutrition with normal speech and articulation. There was slight pallor of the temporal halves of both optic discs. The cranial nerves were otherwise normal and there was no nystagmus. To cotton-wool, pin-pricks, and temperature there was no sensory loss. Joint sense was lost in the right fingers, wrist, and forearm. Vibration sense was diminished in both hands. There was astereognosis with the right hand. The right upper limb was feeble and spastic at all joints, and there was marked unsteadiness of this limb with the finger-nose test. The right lower limb was feebler than the left against resistance, and the gait was feeble and unsteady, with dragging of the right leg. The supinator-jerks, knee-jerks, and ankle-jerks were brisk and equal; there was no ankle-clonus. The right plantar response was extensor in type; the left was flexor. The abdominal reflexes were absent, upper and lower. The cerebro-spinal fluid gave the following reactions: lymphocytes, 2·6 per c.mm.; globulin reaction, negative; gold reaction, 0003442000; Wassermann reaction, negative. The spherula was abundantly present in the cultures.

An autogenous vaccine was given weekly in the following doses: 1, 3, 5, 7½, 10, 12½, 15, 20, 25, 50, 100, 150 millions. Rapid improvement at once set in. Two weeks later, on Dec. 18th, 1928, she was re-examined. The former weakness and spasticity of the right upper limb had disappeared and the gait was normal. The supinator-jerks, knee-jerks, and ankle-jerks were normal; the plantar reflexes were not elicited; the abdominal reflexes were absent as before. When re-examined on May 13th, 1929, she felt perfectly well and walked normally. No sensory loss could now be detected, the former impairment of joint sense and vibration sense in the right hand having disappeared. The slight pallor of the optic discs was unchanged. There was no weakness or unsteadiness of the upper or lower limbs. The supinator-jerks, knee-jerks, and ankle-jerks were normal and there was no ankle-clonus. The right plantar reflex was still extensor; the left was indefinite. The abdominal reflexes were absent as before. The cerebro-spinal fluid gave the following reactions: cells, less than 1 per c.mm.; albumin, 0·025 per cent.; globulin, negative; gold-curve, 0000000000; cultures of the organism proved negative. The blood-serum was strongly inhibitory to the growth of the organism from another patient.

It may, of course, be suggested that in this case the clinical improvement was a natural remission in the course of the disease, and that the administration of the autogenous vaccine was a coincidence. It should be noted, however, that together with the clinical improvement the cerebro-spinal fluid returned to normal, that the cultures of the organism became negative, and that the blood-serum developed a powerful viricidal action.

CASE 3.—A woman of 24 five years previously had transient numbness of the right arm and both feet, lasting several weeks. A year ago she had a mild febrile attack, diagnosed as influenza, after which she suddenly lost vision in the left eye and had persistent giddiness with frequent vomiting for a fortnight. The gait was staggering, and she had persistent subjective numbness of the right arm and leg. After three months the vision in the left eye began to improve, whilst the giddiness and staggering also cleared up.

When first examined on May 4th, 1925, there was pallor of the outer side of the left optic disc. Vision in the left eye was 6/12; in the right it was 6/6. The pupils and cranial nerves were otherwise normal and there was no nystagmus. There was no sensory loss to any form of stimulus, but cotton-wool touches felt "different" in the lower limbs up to the middle of the thighs. There was no weakness or unsteadiness of the upper or lower limbs, and the gait was normal. The deep reflexes were normal, save that the left ankle-jerk was reduced to a mere flicker. Both plantar reflexes were extensor in type; the abdominal reflexes were present. The cerebro-spinal fluid contained 18·6 lymphocytes per c.mm., gave negative Wassermann and globulin reactions, but had a gold-curve of 0223210000. She was placed on systematic arsenical treatment for several months. Later a course of TAB vaccines was also given. In November, 1926, nystagmus was now present, especially to the left side; the physical signs were otherwise unchanged.

A year later, in November, 1927, her physical signs were as follows: The optic discs were slightly pale; there was nystagmus as before. She still complained of subjective numbness of the right arm and leg. The knee-jerks and ankle-jerks were normal and there was no ankle-clonus. The left plantar reflex was extensor in type; the right was flexor. The lower abdominal reflexes were absent; the upper were present, more brisk on the right side.

In April, 1928, the patient volunteered for vaccine treatment. The physical signs were as before. The cerebro-spinal fluid contained the spherula and gave a positive globulin reaction, with a gold-curve of 2233000000. A series of vaccines was given weekly as follows: 1, 3, 5, 7½, 10, 12½, 15, 20, 25, 50, 75, 100 millions. In six weeks the subjective numbness of the right arm and leg, which had been stationary for the past two years, cleared up. At the end of this first series of vaccines, cultures from the cerebro-spinal fluid were negative; the globulin reaction, however, was still positive and the gold-curve was 0023300000.

A second course of vaccines, prepared from the original culture of April, was now given as follows: 100, 150, 200, 250, 275, 300, 350, 400, 425, 450, 475, 500 millions. When re-examined in November, 1928, the left optic disc was pale as before; the nystagmus was reduced to a few horizontal jerks on lateral deviation, confined to the outer eye. There was no sensory or motor abnormality. The knee-jerks and ankle-jerks were normal and there was no ankle-clonus. The right plantar reflex was flexor in type; the left feebly

extensor. The abdominal reflexes were now present, upper and lower. The cerebro-spinal fluid yielded no organisms on culture, but still had a feebly positive globulin reaction together with a gold-curve of 3321000000. Accordingly, a third series of vaccines from the original culture was given as follows: 50, 75, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600 millions.

In April, 1929, and again in February, 1930, the physical signs were unchanged, but on both occasions the cerebro-spinal fluid was now completely normal, as follows: cells, 4 per c.mm.; globulin reaction, negative; gold-curve, 0000000000; cultures were still negative.

CASE 4.—A young business man of 20 had a febrile attack four months ago, lasting ten days. This was followed by weakness and stiffness of the left leg. Two months ago increased deep reflexes and extensor plantar responses were noticed by Prof. Eurich, of Bradford, and the condition was recognised as disseminated sclerosis. The weakness of the legs became bilateral, and he also developed stiffness and unsteadiness of the upper limbs, with delay and precipitancy of micturition.

When first examined, on Oct. 21st, 1927, there was pallor of the temporal halves of both optic discs. The other cranial nerves were normal; there was no nystagmus. To cotton-wool, pin-pricks, temperature, joint sense, and vibration sense there was no sensory loss. Although his handwriting was clumsy, no weakness or unsteadiness could be detected in the upper limbs with the finger-nose tests. The gait was ataxic, with superadded dragging of the right leg, and there was moderate ataxia with the heel-knee tests. The supinator-jerks were brisk, the knee-jerks increased, and there was bilateral ankle-clonus. The plantar reflexes were strongly extensor in type; the abdominal reflexes, upper and lower, were absent. The cerebro-spinal fluid was examined, with the following results: lymphocytes, 19; albumin, 0·025 per cent.; globulin, present; Wassermann reaction, negative; gold reaction, 1332221000.

The patient was treated assiduously at home by a course of neosalvarsan injections. On Jan. 27th, 1928, he was found to be clinically unchanged. He then volunteered for treatment by autogenous vaccines. The fluid gave similar reactions as before—viz., lymphocytes, 4; albumin, 0·025 per cent.; globulin, positive; gold reaction, 3321100000. The spherula was successfully cultured from the fluid. The first series of weekly vaccines was given as follows: 1, 1, 2, 3, 4, 5, 7½, 7½, 7½, 20, 25, 50, 70 millions. After the fifth of these the stiffness of the left leg began to diminish. At the end of this series he was re-examined, on April 26th, 1928, his clinical condition being as follows: There was still slight unsteadiness of the left upper limb; the right was now steady, so that he was able to lace his shoes, which had previously been impossible. The gait was now steady, and he no longer dragged the foot. The supinator-jerks and knee-jerks were normal. There was left-sided ankle-clonus, well sustained; there was now no ankle-clonus on the right side. The plantar reflexes were still extensor. The lower abdominal reflexes were now brisk; the upper were feeble. The cerebro-spinal fluid had the following characters: lymphocytes, 8; globulin, positive; albumin, 0·025 per cent.; gold reaction, 3333200000. The organism was still present.

A second series of vaccines was then given, in the following strengths: 250, 260, 300, 400, 500, 600, 700, 800, 900, 1000, 1500 millions. On the completion of this series he was examined on Sept. 25th, 1928. The optic discs were pale in their temporal halves as before. The cranial nerves were otherwise normal. There was no sensory loss to any form of stimulus, but he still complained of occasional subjective numbness of the left upper limb. The upper and lower limbs moved normally and the gait was normal. The supinator-jerks, knee-jerks, and ankle-jerks were brisk, more so on the left side. There was now no ankle-clonus. The plantar reflexes were still strongly extensor in type. The upper abdominal reflexes were brisk; the lower were not elicited. The cerebro-spinal fluid now gave a negative globulin reaction, the gold-curve was 0000000000, and the organism could no longer be cultured from the fluid.

He now resumed his office work. A course of collosol arsenic was given by the mouth for three weeks in each month. On Jan. 8th, 1929, the clinical improvement was maintained and the physical signs were exactly as before. The cerebro-spinal fluid gave the following results: lymphocytes, 1·4; globulin, negative; gold reaction, 0000000000; the organism was now absent and the blood-serum was inhibitory to the growth of the organism. Since then, repeated clinical and serological examinations have been carried out, in February, April, and June, 1929. On each of these occasions 5 c.cm. of his own inhibitory blood-serum were injected intrathecally.

When last examined, on Sept. 23rd, 1929, he was able to walk and dance normally. The optic discs were slightly pale as before. There was doubtful unsteadiness of the left upper limb with the finger-nose test; all the other limbs were powerful and steady. The gait was normal. The knee-jerks and ankle-jerks were normal and there was no ankle-clonus. The plantar reflexes were feebly extensor; the abdominal reflexes were present, upper and lower. The cerebro-spinal fluid gave the following findings: lymphocytes, 3; albumin, 0·01 per cent.; globulin, negative; gold reaction, 0000000000; cultures of the organism were negative and the blood-serum inhibited the growth in cultures from another patient.

Clinical Results in 70 Cases.

Up to the present date our results in 70 cases may be summarised as follows:—

Cases clinically arrested and now free from the organism	8
Cases clinically arrested and with improvement in the gold-curve and globulin reaction, but still showing the organism	32
Cases apparently uninfluenced clinically	30

When classified according to the stage of the disease at which the cases came under observation our results are as follows:—

—	Clinical symptoms.	
	Improved.	Not improved.
Early cases (10)	9	1*
Moderate cases (27) ..	22	5
Advanced cases (33) ..	9	24

* In statu quo.

Under the heading of "not improved" are included those cases which ceased to deteriorate—i.e., became stationary as regards signs and symptoms, as well as those in which the symptoms continued to progress.

—	Cerebro-spinal fluid changes.	
	Cultures became negative.	Improvement in gold and globulin reaction.
Early cases (10)	4	8
Moderate cases (27) ..	4	21
Advanced cases (33) ..	0	20

From the foregoing it is evident that early cases are the most hopeful with regard to the prospect of stamping out the organism.

Our clinical results, although suggestive, are as yet incomplete, and this communication is necessarily a preliminary one. One point, however, has already emerged—viz., that rarely does a case become serologically negative after a single course of 12 vaccines. Up to the present, in our experience, two series, and more often three or four, or sometimes more, have been required before the organism has disappeared in successful cases. The gold-curve and globulin reaction generally show signs of improvement before the cultures show signs of becoming negative.

These observations require further amplification before we can come to a final judgment as to the appropriate cases for vaccine or serum treatment, the suitable dosage of vaccine, or inhibitory serum, and the methods of their employment, whether to be given alone or in conjunction with other remedies.

Finally, a special word of caution should be borne in mind—viz., that once degenerative and sclerotic changes have occurred in the cells and fibres of the central nervous system, such degenerations are a permanent affair and cannot be removed. Cure, therefore, in the sense of *restitutio ad integrum*, is not to be looked for. The most that can be hoped is to arrest the malady at the stage which it has already reached, to prevent its further advance, and to make the best of those nerve-cells and nerve-fibres which

survive. Hence the importance of recognising and treating the disease in its earliest stages, when the neurones are merely poisoned but not yet degenerated. Fortunately, combined clinical, serological, and bacteriological examinations now enable us to diagnose such cases at an earlier stage than was formerly possible.

Summary.

1. A filtrable virus (*Spherula insularis*) has been observed and cultured by Miss K. Chevassut from the cerebro-spinal fluid in 176 out of 189 cases of disseminated sclerosis.

2. In a control series of 269 cases of other nervous maladies, organic and otherwise, no such organism was observed.

3. Cultures of this virus have been inoculated in a small series of seven monkeys. One of these monkeys developed paralytic symptoms and examination of its spinal cord by the Marchi method shows tract degenerations in one posterior column and one direct cerebellar tract. A second monkey shows degenerations in one antero-median and in both lateral columns.

4. Experimental treatment by an autogenous vaccine has been carried out in a series of 128 cases of disseminated sclerosis; 70 of these patients have been under observation long enough to yield suggestive results. Four illustrative examples are quoted.

5. In a few cases the patient's blood-serum, after vaccine treatment, developed an inhibitory action upon the growth of the spherula *in vitro*.

6. The clinical results, so far, may be summarised as follows:—

Out of 10 early cases, 9 improved and 1 remained in statu quo.
,, 27 moderate cases, 22 improved and 5 not improved.
,, 33 advanced cases, 9 improved and 24 not improved.

7. The serological observations, so far, yield the following results:—

Out of 10 early cases, 4 developed negative cultures; 8 showed improvement in the gold and globulin reactions.
Out of 27 moderate cases, 4 developed negative cultures; 21 showed improvement in the gold and globulin reactions.
Out of 33 advanced cases, in no case did the cultures become negative, whilst in 20 there was improvement in the gold and globulin reactions.

8. In assessing the value of any treatment special caution must be exercised, in view of the well-known tendency of disseminated sclerosis to undergo spontaneous remissions.

9. Degenerations within the central nervous system are a permanent affair and regeneration does not occur. The most that can be hoped for, in any form of treatment, is to arrest the malady at the stage which it has already reached and to make the most of those nervous structures which survive. Restoration of degenerated nervous tissues to normal is not to be expected.

I beg to tender my grateful thanks to many of my colleagues at Westminster Hospital for their continuous kindly encouragement, and for their courtesy in sending me patients for experimental treatment. Especially am I indebted to Dr. D. H. de Souza, Dr. A. S. Woodwark, Dr. A. W. Stott, Dr. Adolphe Abrahams, and Dr. W. E. Lloyd.

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A CASE OF
CALCIFICATION OF THE PERICARDIUM.

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(WITH ILLUSTRATIONS ON SPECIAL PLATE.)

A CASE of calcification of the pericardium was discovered in the course of an opaque meal examination of the stomach. The condition is rare, as shown by the published cases to which I shall refer.

The patient, a woman aged 67, was admitted to the London Hospital under Mr. Hugh Lett, and gave a history of attacks of pain in the upper abdomen, nausea, and vomiting every week or two for 12 months. The attacks were said to last from two days to one week, and they had no relation to exertion. Pain was felt in the right scapular region and down the right side, but was never severe. Freedom from attacks might last seven weeks. There was an indefinite history of indigestion since the menopause. In her previous history mention was made of several attacks of influenza and bronchitis. She had never had rheumatism, chorea, pleurisy, or pneumonia. Up to five months before admission she could walk a couple of miles and enjoy the exercise; she had never been short-winded. Because of her gastric history, she was referred to the radiological department for a barium meal examination to confirm a diagnosis of gastric ulcer.

Radiological Examination.

Before the ingestion of barium the heart appeared strikingly denser than normal. The greatest density was at the right auricular border and along the diaphragmatic border. Where the two joined a sharp angle was formed. Absence of the normal smooth contour of the right auricle was obvious. No pulsation was visible and the aorta was normal. Less evident, but definite, were patches of calcium scattered over the cardiac shadow, but almost absent over the apex. The apical portion of the heart—and this only—was seen to pulsate strongly and freely and to stand out in contrast with the rest of the denser calcium-covered pericardium where no pulsation was visible. The appearance suggested that the strong muscular apical contraction might have interfered with the formation of calcium deposits in that region. The heart as a whole scarcely moved with respiration. On the screen the cardiac apex looked like a living shadow, protruding out of an immovable casing with every pulsation. Some movement of the diaphragm was seen. The lung fields were clear. Slight scoliosis was also present.

Barium fluid given for the examination of the stomach showed no gross deviation of the œsophagus nor any delay, and no obvious radiological evidence of mediastinitis. The gastric examination revealed a definite ulcer near the pylorus, and the general appearance of the pars pylorica suggested carcinomatous changes. The radioscopic gastric findings were confirmed at operation. The pericardial calcification did not cause any untoward result from the anæsthetic or operation, and the patient left the surgical ward in about a fortnight. It seems therefore that in this case, as in some others, the pericardial condition was consistent with fair general health, and the heart worked successfully, even under the strain of anæsthesia and serious abdominal operation. The condition had been totally unsuspected clinically, had given rise to no clinical symptoms or signs, and had apparently not made any difference to the patient's life. It had no connexion with her gastric illness.

Films of the chest (see Plate, Figs. I.–III.) show the obvious calcification of the pericardium, denser in the region where a thick purulent fluid would settle by gravity, and curiously absent or less evident in the region of greatest cardiac impulse, the apex of the left ventricle. There was complete absence of pulsation at the right auricular border, and this suggested fixation (adherent pericardium).

MISS K. CHEVASSUT: DISSEMINATED SCLEROSIS.

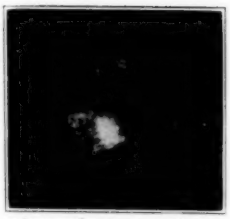


FIG. I.

Photomicrograph of a colony, from a culture of cerebro-spinal fluid from a case of disseminated sclerosis.

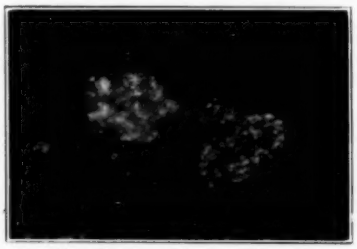


FIG. II.

Two groups of spheres and granules, from a culture of cerebro-spinal fluid from a case of disseminated sclerosis.

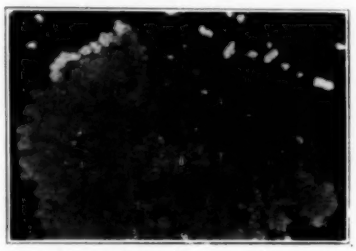
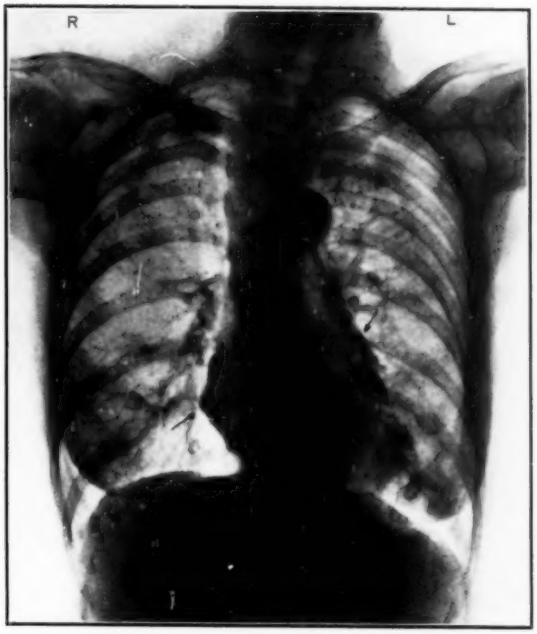


FIG. III.

Large degenerating colony, from a culture of cerebro-spinal fluid from a case of disseminated sclerosis.

DR. VILVANDRÉ.

FIG. I.



Anteroposterior teleradiogram taken at 2 metres' distance with patient standing.

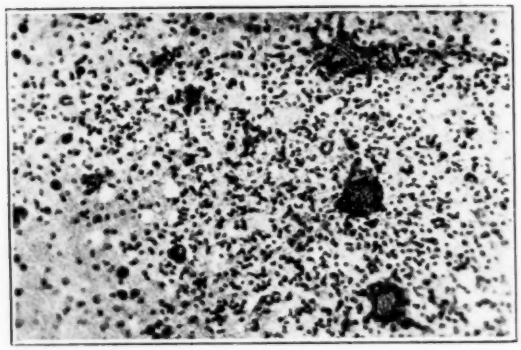
FIG. II.

FIG. III.

Radiograms of chest, taken in right semi-lateral position and in left lateral position.

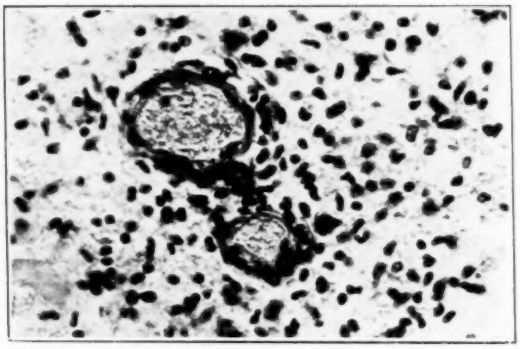
DR. VILVANDRÉ: CALCIFICATION OF THE PERICARDIUM.

FIG. I.



Low-power photograph of the spinal cord, showing the extra-adventitial infiltration around a group of vessels. Note the numerous large spaces in the tissues.

FIG. II.



High-power view of the extra-adventitial infiltrate to show the character of the cells present. Perivascular infiltration, chiefly with fat granule cells, is also seen.

FIG. III.

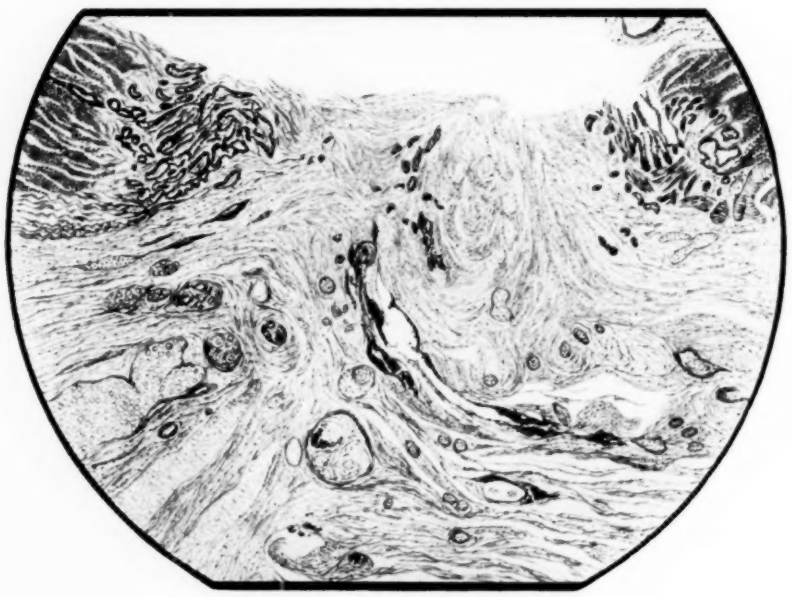
General view of the spinal cord stained by the Weigert-Pal method to show the wide zones of demyelination around the vessels.

FIG. IV.

Weigert-Pal preparation of the spinal cord showing complete demyelination in the areas immediately around the vessels and partial demyelination in the zones peripheral to these.

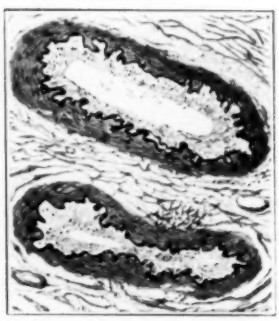
DRS. TROUP AND HURST: ENCEPHALOMYELITIS FOLLOWING SMALL-POX.

FIG. II.



A section through the ulcer × 10. At the margin the tumour can be seen invading the muscle coat. The ulcer is denuded of mucous membrane and is composed of fibrous tissue. A few tumour acini can be seen invading it from below.

FIG. III.



Arteries in the base of the ulcer showing endarteritis × 50.

PROF. KETTLE: MALIGNANT DUODENAL ULCER.

Clinical Examination.

Dr. John Parkinson kindly saw the patient with me a month later. Though rather wasted, she was cheerful and of good colour. The pulse was normal and the superficial arteries were not thickened. The veins of the neck were a little full, but showed no undue pulsation and no collapse. The apex-beat was of natural force and normally placed. The heart sounds were normal at all areas and no murmurs were heard. The electrocardiogram (Fig. IV.) showed a normal rhythm; in lead II. the auricular wave P is rather large, and T is flat, otherwise the curve appears to be normal. There were no symptoms of cardiac distress, and no signs of heart failure. Without the radiological discovery there seemed no reason, from the history or examination, to suspect any cardiac lesion.

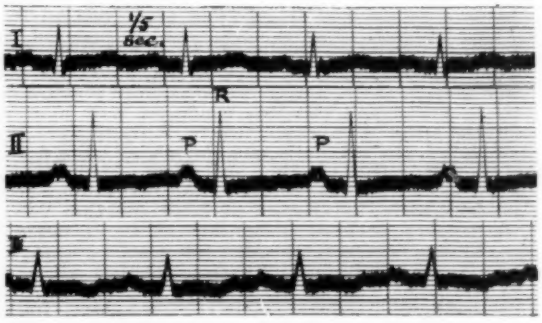
Previous Literature.

Case,[1] up to 1923, had found only 13 instances of a diagnosis of pericarditis calculosa (concretio pericardii) made during life. In July, 1924, Cutler and Sosman[2] added three, two of which were confirmed post mortem. In these two calcification of the endocardium and myocardium was also found at necropsy. They suggest that if calcification could be demonstrated in cases of suspected adherent pericardium there would be greatly increased evidence in favour of that diagnosis. They quote Wells who, in 1000 necropsies, found calcification in 4 out of 128 cases of adherent pericardium. Calcification of the heart itself is well known to pathologists. Scholz,[3] in 1924, described a case of myocardial calcification accidentally found post mortem. He mentions that Morgagni in 1762 published a case of calcification of the heart. Bordenare, in 1768, described a case of adhesive pericarditis and myocardial calcification found at necropsy. Samuel Foart Simmons and Henry Watson, in 1783, published a case of myocardial calcification with an illustration. In their case the patient had died of carcinoma of the œsophagus which, when he was admitted to the Westminster Dispensary, dominated the clinical picture. Watson attempted to explain the calcification, but to him atheroma and myocardial calcification were apparently one. Roth, in 1884, published an autopsy showing calcification of the heart walls, the kidneys, and the interstitial tissue of the gastric mucosa (see Scholz). In 1906 Leyden and Dairdsohn published a report of another necropsy in which there was evidence that calcification of the heart may be part of a calcium metastasis, and that in such cases lungs, kidneys, and stomach form the places of predilection for the deposition of calcium, on account of their abundance of oxygen and acids. In 1907 Hedinger (quoted by Scholz) said that heart calcification was explained by some on the basis of myocardial degeneration, necrotic foci being found by the side of calcified areas, and in the same year Weichert, reporting a similar case (myocardial calcification), looked upon the condition as secondary to myocardial degeneration of bacterial origin.

Mueller (Turner[4]) does not believe that the calcium deposit is due to an increase of the proportion of calcium in the blood, but that a most minute amount is present in each living cell. When the cell dies the calcium is liberated as a carbonate or phosphate and is then precipitated. The causes of pericardial calcification are given as rheumatic or inflammatory chest conditions, pericarditis, or pleurisy. Aneurysm was associated with it in one case, and rupture of the femoral artery in another, and in two separate instances rupture of the coronary and rupture of the right auricle (Turner).

Osler and McCrae[5] say that this remarkable condition may follow pericarditis, especially the suppurative and tuberculous forms, and that A. E. Jones's careful study shows that the condition is usually latent and unrecognised. Allbutt and Rolleston[6] mention that an adherent pericardium may undergo calcification; that "there seems to be good reason to believe that a purulent collection in the pericardium may in exceptional instances be absorbed, leaving dense and thick adhesions, or some of it may remain in an inspissated condition as a yellowish white paste, limited and encapsuled by adhesions consisting of caseous material in which calcareous particles may afterwards form." They describe it as a condition that may follow chronic pericarditis in extremely exceptional instances, and say that the pericardium may become a completely calcified shell, and may even encroach upon the cardiac walls, constituting the so-called "bony heart." They mention that it has been affirmed that a calcified

FIG. IV.



Electrocardiogram from case of calcification of the pericardium.

pericardium may give rise to a peculiar percussion sound of an osteal quality. Turner describes pericardial calcification as a rare pathological finding. He found 89 authenticated cases in the literature; most of them were discovered at autopsy. Turner diagnosed one clinically and found two others post mortem. In his first case the apex-beat was not visible, no shock nor thrills were present, nor could the apex-beat be detected by palpation. The heart sounds were distant and feeble, but no murmurs were audible; the cardiac dullness extended three fingers to the right of the mid-sternal line and four to the left. The radial artery was sclerotic. The patient was sent to the X ray department. Ultimately the diagnosis of marked fibrosis of the right lung and calcification of the pericardium was made.

Absence of Symptoms.

The absence of symptoms is noteworthy and most authors point it out. Schlesinger[7] mentions that most of the cases of pericardial calcification are characterised by their symptomless development, their frequency in early adult life, and the freedom of the great vessels from involvement. Failure of the heart is late and probably due to other causes, and there is often ascites. An unusual symptom of the condition was found in a case, described by Wallace Jones and Roberts[8] in 1927, where the patient, a young man, had dyspnœa and marked cyanosis, the former being relieved by rest but the latter not improved by inhalation of oxygen. They gave an electrocardiogram of their case. The heart does not appear to become embarrassed, despite what would be expected and has been taught; it seems to go on performing its functions satisfactorily for many years, in some cases for 10 or 20 years.

A. E. Jones, quoted by Osler and McCrae, found that no cardiac symptoms were present in 38 of his 59 collected cases. In only one of the 59 was adherent pericardium diagnosed, and calcification was not suspected in any (Turner). Mitchell[9] remarks, "How is it that the heart, encased in a vice-like grip, functions with apparently so little disturbance?" It is indeed surprising. In my case the apex was functioning freely. Turner mentions that in Drummond's case the pathologist had to use bone forceps to cut the pericardium, but a few weeks previously the man had

been a sailor working before the mast. In Douglas and Yates's case the patient was 25 when he died of pneumonia, and the condition discovered post mortem had been totally unsuspected (Turner). Although X rayed before death, the case reported by Langmead[10] in 1912 had not been recognised radiologically, the report stating that "the shape of the heart is most peculiar. There appears to be a protuberance from the left ventricle near the apex, pulsation of which appears to be more vigorous than that of the ventricle, and its walls are thinner. The appearance suggests aneurysm of the left ventricle." In 1917 Mueller[11] emphasised that his eight cases had in common the entire absence of clinical findings which might suggest calcification of the pericardium, but he mentions the success of Rieder, Groedel, and Schwartz, all of whom made a radioscopic diagnosis of the condition in a living subject. Turner says that in none of his patients was there any marked clinical symptoms pointing to a serious heart condition, but the X rays in one case enabled a diagnosis of calcified pericardium to be made, and this was confirmed post mortem. In the other two cases, where X rays were not employed, the diagnosis was not made before death.

Stone[12] mentions that adhesions between the visceral and parietal layers of the pericardium may produce little disturbance of heart function "even when more or less obliteration of the pericardial cavity has occurred, provided the heart's contractile efforts are unimpeded by extrapericardial adhesions to the chest wall and surrounding structure of the mediastinum." When this occurs there follow certain signs and symptoms which he enumerates, and among which is rotation of the heart towards the back, accompanied, according to his observations, by a friction-rub synchronous with the heart's action below the angle of the left scapula and possibly not heard over the anterior portion of the chest. He shows a radiograph of a case of pericarditis and mediastinitis. He further mentions that under the fluoroscopic screen diminished pulsating excursions of the cardiac shadows may occur, and that the deposition of lime salts in the connecting tissue after chronic inflammation is not an unusual pathological finding. Although it may occur in the endocardium or myocardium, the pericardium is usually more extensively involved. He adds that the clinical signs and symptoms may be inconclusive, and that the main evidence will be radiological. Under X rays fixation of the apex and the failure of the apex to descend upon inspiration may occur. Cutler and Sosman emphasise the importance of careful radioscopic and radiographic examination in all cases suspicious of adherent pericardium, especially because the clinical diagnosis is unlikely to be made with certainty and further because the operation of cardiolysis and excision of the pericardium is followed by favourable results. Stone puts forth a similar view.

The honour, or good fortune, of being the first to record a case of pericardial calcification rontgenologically appears to be in dispute. According to Stone, Schwartz, in 1910, was the first to show a case of calcified pericardium during life by radioscopy. Starck[13] also mentions this, and Groedel described one in 1912. Scholz[14] mentions a case of myocardial calcification demonstrated during life. He says that there are only two previous instances on record —viz., the cases of Groedel and Le Wald. In neither of these cases was an autopsy obtained, so that no final decision can be given on whether the findings described by the authors were due to calcification in the myocardium or pericardium. He therefore claims that his case is the first authentic one. Cases of pericardial calcification were described by Rieder, Weil, Müller, Heimberger, Youmans and Merrill, Klason Zelibe, and others. The discovery of the cases was sometimes a chance and sometimes induced by the presence of slight heart failure, or of Pick's pericarditis of the pseudo-liver-cirrhosis type.

The principal point in the differential diagnosis between pericardial and myocardial calcification is that the flakes of calcium will be seen tangentially in the pericardial condition, and for that purpose antero-posterior and lateral views should be taken. Scholz recommends the use of intensifying screens, and rapid yet sufficient exposures to show the plaques. The Potter Bucky diaphragm can be used to increase the contrast of shadows, but the sharpness of outline of the beating heart is sacrificed.

In the case described I used a teleradioscope, taking the films at a distance of 2½ metres. Unless the radiologist is aware of the condition it can be missed in a hasty screening, especially as the usual soft radiations employed for the detection of pulmonary lesions only show the outline of the heart and cast no obvious contrasting shadows of the heart substance itself.

My thanks are due to Mr. Hugh Lett, to whose courtesy I am indebted for permission to publish this case, and to Dr. John Parkinson, who saw the case with me later and took the cardiogram.

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DISSEMINATED ENCEPHALOMYELITIS FOLLOWING SMALL-POX.

WITH REPORT OF A FATAL CASE.

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(WITH ILLUSTRATIONS ON SPECIAL PLATE.)

As a result of the attention paid during recent years to the disseminated encephalomyelitis following vaccination, the peculiar character of the lesions, as well as the fairly distinctive clinical features of many of the cases, have become common knowledge. It is not, however, generally known that a similar complication may arise in the course of measles, small-pox, and other infective fevers, or even during antirabic treatment. The encephalomyelitis of measles has been very fully studied by Greenfield (1929) and others, and it is clear that the histological lesions in these cases are indistinguishable from those of the post-vaccinal disease. While, however, there are to be found in the literature a few cases of encephalomyelitis following small-pox in which the descriptions are sufficiently precise to allow of their probable identification with the disease under discussion, the accounts are for the most part very incomplete, and in any case date back to a time when the characteristic histological feature—namely, perivascular demyelination—was unrecognised. The following case, therefore, appears to merit description.

Clinical History.

The patient, an unvaccinated man aged 63, was admitted to the Willesden Small-pox Hospital on June 7th, 1929, the ninth day of illness and the fifth day of rash. He had

attended a wedding party on May 19th at which an unrecognised case of small-pox (alastrim) was also a guest. Fifteen other people were infected either directly or indirectly from the same source but no complications arose amongst these associated cases. The rash was discrete, typical in distribution, and in the pustular stage. The temperature was normal and the pulse-rate 76. The eyes were inflamed and discharging. The general condition was good.

On June 10th he complained of slight pain in the right knee, but examination failed to reveal any abnormality, and he was able to get up for baths. On the 13th he asked for permission to get up, which was granted. During the night of the 13th–14th he slept well, but on the morning of the 14th he complained of severe pains in the abdomen and legs, the former appearing to be of the girdle type. The temperature rose to 101° F. and he had several rigors with profuse sweating. There was retention of urine, the bladder reaching to nearly the level of the umbilicus, and it was thereafter necessary to pass a catheter twice daily until his death.

On the next day complete flaccid paralysis of the lower extremities with involvement of the abdominal muscles had developed. The knee-jerks, the plantar and the abdominal reflexes were absent. Tactile, thermal, and pain sensations were very much impaired and later were lost. The pupils were contracted and reacted sluggishly to light and accommodation. The temperature rose to 104° F. and there was a recurrence of the rigors. The pulse was 122, regular, and of good volume. The heart sounds were feeble and there were signs of congestion at the bases of the lungs. The paralysis did not at this time affect the upper extremities, though later there was considerable diminution of muscular power in the arms, so that the patient could not feed himself. He was very drowsy and did not appear to understand what was said to him. On the following day he complained of severe headache and there was albumin in the urine. It was also noticed that the skin over the sacrum was affected; a large bed-sore subsequently developed, the tissues becoming gangrenous.

Incontinence of fæces developed on June 17th; before this the patient had been constipated. From this date until the patient's death there was gradual muscular wasting, more particularly in the lower extremities. The temperature ranged between normal and 102·6° F., falling in the morning and rising in the evening. The physical signs at the bases of the lungs became more pronounced and a troublesome cough developed. There was great difficulty in expectoration, due to paralysis of the intercostal muscles and to the viscid character of the sputum. The mental condition varied; occasionally the patient was in a comatose condition but capable of being roused; at other times he was alert and able to answer questions in an intelligent manner. On several occasions, particularly during the night, he had delirium of a low muttering type. On June 28th a painful swelling developed in the neighbourhood of the right parotid gland but subsided within five days. Evidence of cystitis was noticed on July 4th. Death took place on the ninth.

Specimens of the cerebro-spinal fluid and blood were taken on June 20th. The former was under slight pressure, but examination showed no abnormality. Wassermann tests with cerebro-spinal fluid and with blood proved negative.

Pathological Examination.

As permission for a full autopsy was not secured, only the brain and spinal cord were examined. The middle and lower lumbar and sacral cord was reduced to a very soft, greyish-pink mass and could not be removed except as a pulp; elsewhere the nervous tissue was of normal consistence and no other macroscopic abnormality was noted.

After pieces had been placed in formol bromide, to be cut later as frozen sections and stained by Penfield's modification of the Hortega method for microglia, the bulk of the brain and cord was fixed whole in 10 per cent. formol saline. Tissue was later embedded in celloidin and sections were stained with hæmatoxylin and van Gieson and by the Nissl method. Other blocks were mordanted and sections stained by the Weigert-Pal procedure. Finally frozen sections were used for the demonstration of fat and of neurofibrils by the Bielschowsky technique.

Description of Lesions.

Microscopically the lesions consist partly in perivascular infiltration and partly in changes (extra-adventitial) in the nervous tissues immediately surrounding the vessels; in all the affected parts of the nervous system this association of the pathological changes with the vascular apparatus is observed.

Perivascular infiltration—that is, the accumulation of cells in the Virchow-Robin spaces—is usually not very intense. In the case of many vessels, only a few cells, insufficient to produce a complete ring around the vessel, are present, while in others the cuff is more complete; perivascular sheaths several cells deep are, however, nowhere observed. Occurring as a rule in vessels surrounded by zones of demyelination, in a few regions this infiltration occurs in the absence of other changes. Lymphocytes, large and small, with occasional plasma cells, form a small percentage of the cells present, but the majority are granular corpuscles which, in sections stained for fat, are seen to be heavily laden with the lipoid products of myelin disintegration.

The extra-adventitial lesions are characterised by zones of demyelination, which in severely affected regions such as the spinal cord are very extensive and often coalesce with the similar areas around adjacent vessels. In Weigert-Pal preparations the inner two-thirds of these zones are usually wholly free from myelin sheaths, while the outer third, in which the majority have been destroyed, may show a few persisting but ballooned and distorted myelin tubes (see Plate, Fig. IV.). At the periphery of this zone, which with the lower powers of the microscope is quite sharply demarcated, the myelin sheaths are normal.

Corresponding to the destruction of the myelin sheaths, there is, immediately around the vessels, considerable cellular infiltration, which in sections stained by the ordinary tissue stains is the most prominent feature (Figs. I. and II.). Most of the cells are microglial, in various stages of development up to the fully formed granular corpuscle. While showing a certain polymorphism, their nuclei do not exhibit the excessive irregularities and grotesque forms seen in the acute cases of the similar condition following vaccination; this is no doubt due to the fact that the present case was of much longer duration and had progressed to a stage of partial reparation. Their bodies are filled with fatty globules. While, however, there is much fat in these cells and in the similar elements in the Virchow-Robin spaces, the total amount is often small when compared with the extent of the demyelination; the observation made in post-vaccinal encephalitis that the waste lipoid products are removed from the damaged area with unusual rapidity seems equally to apply to the present case.

The other type of cell present in the demyelinated areas is a definitely enlarged glial cell with a large pale nucleus and abundant cytoplasm prolonged into numerous short processes; no fibre formation can at this stage be demonstrated. Leucocytes, of any variety, are absent from most of these areas, though here and there in the grey matter of the spinal cord a few focal collections of lymphocytes occur.

The use of the Bielschowsky method shows that a few axis-cylinders persist in the zones of demyelination; their number is, however, far below the normal and, of those that remain, many are thickened and stain more intensely than usual or show numerous fusiform, globular, or irregular swellings in their course.

Throughout the nervous system the nerve-cells are remarkably well preserved, and even when involved in a densely infiltrated area present no definite changes in their Nissl substance or in the shape, coloration, and position of the nucleus.

Distribution of Lesions.

Spinal cord.—The brunt of the morbid process has fallen on the spinal cord, though not equally on all regions; the transition from a severely damaged to a slightly affected or even normal segment is often very abrupt. As already stated, much of the lumbar region was so soft that sections could not be prepared. In the segments immediately above this region the changes are very intense and at first sight not obviously perivascular; owing to the fusion of many zones of infiltration and demyelination, the lesions appear to be more or less diffuse over a wide expanse of grey and white matter. There is considerable rarefaction of the tissues and large spaces appear in the sections: present even in frozen sections, they are not due to shrinkage in the celloidin or paraffin, and they are not filled with fat (Fig. I.). Microglial and glial proliferation is very prominent. A few mononuclear cells are present in the anterior fissure.

In the dorsal cord the extent of the lesions varies greatly at different levels, but no segment examined has completely escaped; the mid-dorsal segments are perhaps least affected, while in the lower dorsal region almost every vessel in the white matter shows a wider or narrower zone of rarefaction and infiltration. Perivascular cuffing is more definite than in other parts of the nervous system. Both grey and white matter is involved, and though at some levels the antero-lateral regions have suffered most, at others the posterior columns are also the seat of marked changes. In the middle and lower cervical cord similar severe changes are seen; the upper cervical segments are free from lesions.

At no level is the narrow zone of demyelination, not infrequently met with in post-vaccinal encephalitis, observed in the marginal zones of the cord or along the lips of the anterior fissure.

Brain-stem.—Except at the lower end of one olive, where a single vessel is surrounded by a wide zone of infiltration, the medulla is quite free from the typical lesions; a few vessels do, however, show simple perivascular cuffing of mild degree. The disease reappears in moderate intensity in the pons, where the central substance is chiefly affected, but almost disappears again when the mid-brain is reached.

Cerebellum.—Many vessels in the white matter are severely affected.

Cerebrum.—Here, somewhat surprisingly perhaps, changes are almost entirely absent. Very many sections from numerous regions of the cortex and subcortical white matter were examined, and only one vessel showing the characteristic lesions was found; simple perivascular infiltration is, however, not infrequent. In the basal ganglia, also, apart from a small group of three or four closely adjacent vessels in one optic thalamus, definite evidence of involvement is wanting. Over the whole of the anterior part of the putamen, the microglia, without being increased in amount, is chiefly in the form of rod-cells containing numerous fine fatty granules; this appearance is not encountered elsewhere and its exact significance is uncertain.

Discussion.

According to Greenfield (1929), cases of nervous disease arising as a complication of or as a sequel to small-pox have been known for two centuries, and references may be found in the writings of Clifton (1724) and Freind (1730). Aldrich (1904), who gives a fairly complete résumé of the earlier literature, states that cases of paralysis have been recorded since the history of the disease passed from tradition to record. The fortunate outcome of many of the cases led to a diagnosis of neuritis. Southard (1904) believed most of such cases occurring during the Boston epidemic of 1901–03 to be due to secondary infection with the streptococcus or pneumococcus. Immermann (1902) considers that variola possesses in a prominent degree the power to awaken latent predispositions to nervous affections, as well as to create neuropathies directly; the complications are in no way related to the severity of the case, and affect all provinces of the nervous system. The spinal cases are no doubt due to a disseminated myelitis. MacCombie (1905) states that in variola the nervous system is more often involved than in any other acute eruptive infection; Rundle (1929), on the other hand, has never personally seen this complication. Osler and McCrae (1926) make only brief mention of the possibility of involvement of the nervous system. Schamberg and Kolmer (1928) have observed eight instances of paralysis among about 3000 cases of small-pox; of this number, five died and three recovered. Rolleston (1929), among the records of 10,000 patients in the London epidemic of 1901–02, could find only 25 examples of complications affecting the nervous system.

A study of the literature accumulated before the beginning of the present century is not very fruitful, for the clinical descriptions of the cases always leave room for speculation on the nature of the underlying pathological processes. Pathological examinations have been few; the histological methods employed were naturally often inadequate and, where lesions in the central nervous system were found, in the absence of illustrations it is often impossible to visualise the appearances described. Nevertheless, among the cases of convulsions, febrile delirium, psychosis, meningitis (usually purulent), and other nervous manifestations arising during or shortly after an attack of small-pox, one is struck with the frequency with which two groups of symptoms recur.

In one group (Westphal, 1872, Whipham and Myers, 1886, Combemale, 1892, Schamberg and Kolmer, 1928, &c.) a paralytic or ataxic state has been accompanied by peculiar speech disturbance and sometimes by mental changes, a clinical picture resembling in some respects disseminated sclerosis; Marie (1884), Sottas (1892), and others have described examples of that disease following variola, but, while some appear to be typical, many have differed by ultimately improving or recovering completely. Aldrich (1904) believes that small-pox may be followed by a disseminated encephalomyelitis of sufficiently characteristic features to entitle it to recognition as a clinical entity; individual cases may bear some resemblance to disseminated sclerosis, but the majority are only "coarse imitations."

In a second group paraplegia, with or without sphincter disturbances and incomplete sensory loss, has often tended either to rapid recovery or to death from such secondary causes as urinary sepsis; this symptom-complex recalls that in the present case. Cases of this nature have been placed on record by Leroy d'Étiolles (1856), Gubler and Laborde (1871), Guttstadt (1872), Westphal (1874), Spiller (1903), Eichorst (1913), and Schamberg and Kolmer (1928); in the majority the paralysis has developed within a fortnight of the appearance of the variolar eruption. In both of Spiller's cases this symptomatology obtained. The first was subjected to an incomplete histological examination which revealed no abnormality; the second was accepted as a case of acute poliomyelitis, though the author mentions that the involvement of the nerve-cells was not very marked. Westphal's description of the microscopical appearances would be compatible with the existence of a disseminated encephalomyelitis of the type described in this paper, while Eichorst's description and illustrations leave no doubt that he had encountered the same disease, although he failed to recognise the characteristic extra-adventitial demyelination.

Finally, some of the cases of paralysis following small-pox can be definitely ascribed to other infections. The case of Damaschino (1871) was almost certainly one of acute poliomyelitis, the diagnosis made by that writer, while in that of Oettinger and Marinesco (1895), which was clinically a Landry paralysis, and was mentioned by Perdrau (1928) as possibly belonging to the same group as post-vaccinal encephalitis, infection with streptococci cannot be excluded.

In recent literature we have been able to find only one reference to nervous disease following small-pox. McIntosh and Scarff (1928) mention the case of a child who developed cerebral symptoms after mild variola; "the pathological changes found in the brain showed a very close resemblance to those of post-vaccinal encephalitis." McIntosh (1928) describes the lesions as follows. "The histological lesion consists of a perivascular, small-celled infiltration, characterised by a slight infiltration of the vessel-sheath, and a more diffuse wide infiltration of the surrounding parenchyma, which often shows well-marked demyelination of the nerve-fibres."

Reference to the returns of the Registrar-General showed that during the last five years the incidence and mortality of variola in England and Wales have been as follows.

Year.	Cases notified.	Deaths.
1925	5,354	6
1926	10,141	11
1927	14,787	36
1928	12,420	53
1929 (to Sept. 30th) ..	8,541	34
Total ..	51,243	140

In 23 of these fatal cases conditions affecting the central nervous system are entered on the death

	Age.	Diagnosis.
1. ..	76 y. ..	Variola; hemiplegia; heart failure.
2. ..	39 ,, ..	Small-pox; meningitis.
3. ..	20 d. ..	Small-pox; infantile convulsions.
4. ..	14 y. ..	Small-pox; coma.
5. ..	13 m. ..	Small-pox; meningitis.
6. ..	10 y. ..	Acute encephalitis; variola.
7. ..	14 ,, ..	Cerebral thrombosis; variola.
8. ..	22 ,, ..	Encephalitis lethargica; small-pox.
9. ..	69 ,, ..	Cerebral softening; myocardial degeneration; small-pox.
10. ..	67 ,, ..	Cerebral hæmorrhage; small-pox.
11. ..	70 ,, ..	,, ,, ,,
12. ..	78 ,, ..	Cerebral hæmorrhage; arterial sclerosis; small-pox.
13. ..	54 ,, ..	Small-pox; diabetic gangrene of toes; hemiplegia.
14. ..	72 ,, ..	Small-pox; hemiplegia.
15. ..	55 ,, ..	Cerebral thrombosis; small-pox; fractured base of skull.
16. ..	64 ,, ..	Small-pox; hemiplegia.
17. ..	75 ,, ..	Small-pox; cerebral degeneration.
18. ..	67 ,, ..	Chronic encephalitis; variola.
19. ..	68 ,, ..	Cerebral embolism; arterial sclerosis; small-pox.
20. ..	2 m. ..	Meningitis; small-pox.
21. ..	45 y. ..	Encephalitis; small-pox.
22. ..	16 m. ..	Tubercular meningitis; general tuberculosis; small-pox.
23. ..	63 y. ..	Myelitis; small-pox.

d., m., y. = days, months, years.

certificate as the cause or as a contributory cause of death.

Case 6 is the one recorded by McIntosh and Scarff, while Case 23 is that described in this paper. Of the remainder, many are almost certainly instances of vascular lesions occurring in elderly patients, but the diagnoses returned in several—e.g., Cases 4, 8, 18, and 21—suggest that perhaps our case and that of McIntosh and Scarff do not stand alone. In the absence of further information, however, this must, of course, be mere speculation.

To turn to the clinical features of our case, the mode of onset of the nervous symptoms suggested at first a diagnosis of transverse myelitis, and it was only later that a certain degree of weakness in the arms and a variable drowsiness indicated extension of the disease process to regions above the lower cord. The symptomatology is thus rather different from that obtaining in post-vaccinal encephalitis, in which, if the patient survives the initial attack, recovery is usually complete; if death occurs it is due to secondary causes, and there is, as a rule, no evidence of a later extension of the nervous lesions. In the post-vaccinal cases the first manifestations of nervous disease commonly occur on the 10th–13th day after vaccination. In the present case the interval between the onset of the illness and the appearance of nervous symptoms was 12 days, taking the pain in the right knee noticed on June 10th as the first sign, or 16 days if the development of definite girdle pain, &c., is accepted as the first indication. Post-vaccinal encephalitis almost always occurs when primary vaccination is performed in late childhood or adult life; it is worthy of remark that our patient had never been vaccinated. Pathological examination showed that although the chief incidence of the disease was on the spinal cord, with less severe involvement of parts of the brain-stem and cerebellum and only slight changes in the higher regions, it was impossible histologically to differentiate between the lesions in this case and those of the disseminated encephalomyelitis following vaccination, measles, &c., or to detect any differences in the cellular reaction other than those to be ascribed to the subacute course of the infection. It is, of course, possible that a number of viruses of widely different pathogenic properties can in the central nervous system produce lesions of identical nature, but the theory most acceptable to the writers is that the disease under consideration is not directly due to the causative agent of the particular fever in the course of which it develops, but is to be attributed to some factor (associated infection or toxæmia) which happens at the same moment to be latent in the patient and requires merely to be stimulated into activity to exercise its specific action. In this connexion it is interesting to note that of 15 other persons infected from the same source as the present case and under observation at the same time, not one developed any nervous complication.

What this factor is is not known. Some have postulated a latent infection with the virus of encephalitis lethargica or herpes, while others are disposed to incriminate another unknown filtrable virus. Schurmann (1928) and others in post-vaccinal encephalitis, and Wohlwill (1928) in measles encephalitis find, in addition to the perivascular changes, marked lesions under the ependyma of the lateral ventricles and under the pia mater of the brain and cord; the latter observer has suggested the possibility of a soluble toxin attacking the nervous system by way of the blood stream and cerebro-spinal fluid.

A consideration of the relation between this and other diseases characterised by demyelination also brings us to insecure ground. Under the term disseminated encephalomyelitis cases of very similar histological appearance and occurring independently of any exanthem have long been described; Anton and Wohlwill (1912) consider them to be acute forms of disseminated sclerosis. Redlich (1927) has observed a recent increase in the number of such cases seen clinically, which show a definite tendency to complete or almost complete recovery, and he also believes that typical disseminated sclerosis has during recent years become more frequent. Wohlwill (1928) believes that a distinction can be made between this disseminated encephalomyelitis and disseminated sclerosis on the one hand, and the disease following measles on the other, by the fact that in the former the foci involve only a segment of the affected vessel while in the latter the changes continue along its whole length. Turnbull (1928), however, thinks that the pathological processes are essentially similar, and that the different conditions may represent modified reactions to a single agent. Obviously the question cannot be settled until more histological material has accumulated, or until by animal experiment or otherwise the agent responsible for the lesions has been identified.

Conclusions.

The clinical and pathological features of a case of disseminated encephalomyelitis following small-pox are described and the literature on the subject is reviewed.

The pathological changes are indistinguishable from those in the disseminated encephalomyelitis following vaccination, measles, &c., and it is not improbable that all these cases are examples of a single disease which, latent in the patient at the time of infection, is wakened into activity by the causative organism of the acute fever or by the lowering of the patient's resistance for which that organism is responsible.

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A NEW HOSPITAL AT TIVERTON.—Tiverton Hospital has become so inadequate that it has been decided to erect a new and more easily workable building at a cost of £30,000. In the last nine years the number of in-patients has trebled, and there is need for a maternity ward and additional private wards. No additions have been made to the buildings since 1906.

MALIGNANT CHANGE IN A CHRONIC DUODENAL ULCER.

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(WITH ILLUSTRATIONS ON SPECIAL PLATE.)

PEPTIC ulceration of the stomach and duodenum is a common disease which, fortunately, appears to be amenable to medical treatment, at least in the majority of cases. Even long-standing ulcers of considerable extent can be coped with satisfactorily without resort to operative measures. But a question which must have a serious bearing on treatment is the relation of peptic ulceration to malignant disease. For if it can be proved that the frequency of carcinoma is significantly greater in the ulcerated than in the non-ulcerated stomach, the wisdom of medical treatment becomes immediately open to question, and the arguments in favour of excision of the ulcer are correspondingly strengthened.

Malignant Change in Gastric Ulcers.

Opinions are still divided as to the number of gastric ulcers which become malignant. On the one hand there is the teaching of the Mayo Clinic[1] who find malignant change in 7·1 per cent. of gastric ulcers; on the other is the statement of J. Ewing,[2] whose figures are in the region of 2–3 per cent. A. F. Hurst and M. J. Stewart,[3] in a series of 180 chronic gastric ulcers, found malignant disease in 6·1 per cent., and have only once found evidence that a carcinoma started in the scar of a healed ulcer. These discrepancies are no doubt due to differences in the criteria both of malignancy and previous ulceration demanded by different observers.

Evidence of malignancy must be unequivocal and must not merely consist of the presence of misplaced epithelium in the margins of the ulcer; while the proof that an ulcer preceded a carcinoma depends partly on the clinical history of the patient and partly on the histological features of the growth. A history of dyspepsia of long standing is of obvious importance, but this is not always forthcoming even in authentic cases of ulceration. On the other hand, a searching cross-examination of many apparently healthy individuals may bring to light symptoms which may be interpreted as pointing to a gastric or duodenal ulcer. Clearly the value to be placed on the clinical history must depend largely on the experience and judgment of the physician.

The histological diagnosis is possibly easier. In the chronic gastric ulcer the muscle coat in the floor of the ulcer is invariably destroyed and is replaced by dense inflammatory fibrous tissue, and a patchy though notable endarteritis is frequently found in the neighbouring vessels. In the primary cancer, on the other hand, the tumour cells infiltrate the muscle coat of the stomach which survives in the substance of the growth until that has become so large as to make the recognition of the primary lesion impossible. And endarteritis and other signs of inflammation are much rarer in the primary carcinoma than in the ulcer-cancer.

Irritation and Malignancy.

Whether the gradual destructive processes which produce the chronic peptic ulcer are comparable with those irritative conditions which are known to determine the occurrence of malignant disease in, for example, the skin, is open to doubt. In the cancer which can be produced experimentally by the application of tar to an epidermis, the malignant process is usually preceded by a simple, non malignant proliferation of the epithelium; and the same is seen in the carcinomata of the skin familiar in certain industrial conditions. Excessive application of the irritant causes ulceration and is not followed by the production of carcinoma. In the peptic ulcer the process is essentially a progressive digestion of tissue; there may be slight hyperplasia of the epithelium at the margins of the ulcer, but this is rarely extensive, and there is nothing like the irritative hypertrophy which follows the application of true carcinogenetic substances, or even foreign bodies such as *Gongylonema neoplasticum*.

If peptic ulceration has any power at all to determine the development of carcinoma it is probably because of the separation and isolation, by the proliferating fibrous tissue at the margins of the ulcer, of small fragments of epithelium. This being so, it might be expected that peptic ulcer of the duodenum would also be the forerunner of malignant disease, for except in one particular, though possibly a very important one, the process in the duodenum is essentially the same as that in the stomach. The sole difference is the additional trauma to which the gastric ulcer is exposed from solid, imperfectly masticated food. But ulcer-cancer of the duodenum is excessively rare.

FIG. I.

Pylorus and duodenum opened from the front. Glass rods in the pancreatic and common bile-ducts appear at the ampulla of Vater (× ⅔).

In a series of autopsy records collected from various sources, J. B. Deaver[4] found 50 examples of carcinoma of the duodenum in 151,201 cases, and states that 30 of these arose in ulcers. It may well be that a more rigid examination of these 30 cases would demand the elimination of a number of them. The current teaching in this country is that ulcer-cancer of the duodenum is little more than a possibility. Hurst goes so far as to say that duodenal ulcers never become malignant, and though this is a statement which it is theoretically impossible to support, most people will agree that it expresses a good working rule.

Record of a Case.

The case here recorded is regarded as a true example of a duodenal ulcer-cancer; it illustrates well the

difficulties which have to be met in arriving at the diagnosis.

The patient, a man aged 68 years, was admitted to St. Bartholomew's Hospital on Nov. 29th, 1929, complaining of vomiting. He was very ill and was inclined to wander, and the history of his illness was difficult to obtain. He is said to have suffered from vague pain in the upper abdomen with dyspepsia for three years. During the latter half of 1928 there was persistent and rather severe diarrhœa and in the beginning of 1929 flatulence and dyspepsia, starting two and a half hours after food and lasting for an hour, became more pronounced. The pain increased, and five months before admission to hospital vomiting became a prominent symptom, increasing till it was almost continuous. While in hospital he could retain nothing given by the mouth, and it was impossible to investigate him thoroughly. An X ray examination showed that the barium meal hesitated to pass into the second part of the duodenum, which never became properly filled; but no further tests could be made, and he died on Dec. 3rd, four days after admission, with the tentative diagnosis of carcinoma of the stomach. At the post-mortem examination on Dec. 4th the body was found to be extremely emaciated. There was a moderate degree of terminal hypostatic pneumonia, but no other morbid change was found, except in the stomach and duodenum.

The stomach was dilated and contained two and a half pints of fluid. Its wall was slightly hypertrophied, its mucous membrane was smooth, and showed no trace of old or recent ulceration. Similarly, the first part of the duodenum was dilated and hypertrophied, though its mucosa appeared natural.

Situated about 4·5 cm. from the pylorus and midway between it and the ampulla of Vater was an annular ulcer which surrounded the bowel, except for a small area behind (Fig. I.). The actual ulcer measured 3 by 1 cm., but its margin was thick and raised especially on the posterior and upper aspect, where a firm mass of growth extended for at least 1 cm. beneath the mucosa. The floor of the ulcer was smooth and clean, and it did not involve the head of the pancreas or the common bile-duct. Two small white glands were found in the gastro-hepatic omentum.

Microscopic examination shows an adenocarcinoma, involving the whole of the periphery of the ulcer and extending to the peritoneal coat. The two lymphatic glands contain secondary growth which shows a pronounced tendency to mucoid degeneration and has very little stroma.

Histological Evidence.

The condition, then, is undoubtedly malignant, and the histological evidence that the carcinoma started in a simple ulcer seems equally clear. The centre of the ulcer (see Plate, Fig. II.) is composed of dense fibrous tissue which extends to the peritoneal coat. The muscle coats have been entirely destroyed, though they appear abruptly again beneath the mucosa at the margins. The fibrous tissue is fairly well vascularised and some of the smaller arteries show well-developed endarteritis (Fig. III.). At the periphery the submucosa and muscle coats are invaded by the carcinoma, but the ulcer itself is free except for a few acini which are spreading from the margin into the centre towards the surface. A large portion of the ulcerated area, therefore, contains no growth; and unless we are to believe that the primary lesion was an intensely scirrhous carcinoma in which the growth of the stroma enormously outstripped that of the malignant cells, an hypothesis entirely at variance with the histology of the rest of the tumour and its metastases, we are forced to the conclusion that a peptic ulcer existed before the development of the carcinoma.

It must be admitted that the position of the lesion is against this view, since the great majority of peptic ulcers are situated considerably nearer the pylorus; and the clinical evidence of long-standing ulceration is not conclusive. The histological evidence, however, seems strong enough to outweigh these objections, and viewing the case as a whole it seems justifiable to accept it as an example of ulcer-cancer.

In view of the frequency of ulceration of the duodenum it is remarkable that so few undoubted cases of ulcer-cancer have been recorded. Their scarcity strongly supports the view of those who hold that there is nothing inherent in the peptic ulcer which predisposes to malignancy, but that cancer develops in an unhealthy rather than an ulcerated epithelium.

I am indebted to Dr. H. Morley Fletcher, under whose care the patient was while in hospital, for permission to publish the records of the case.

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Medical Societies.

MEDICAL SOCIETY OF LONDON.

AT a meeting of this Society on March 10th, with MR. DONALD ARMOUR, the President, in the chair, a discussion took place on

CARDIAC INFARCTION.

DR. J. W. MCNEE, in opening, said this subject was of the greatest clinical interest, both to the general practitioner and the physician or surgeon. He would himself deal with it as a general physician. Until 1924 he knew nothing about cardiac infarction as a part of clinical medicine, though he had seen and made necropsies on well-marked cases, and even on cases of cardiac aneurysm with rupture of the ventricle. But while he was at Johns Hopkins Hospital, Baltimore, in 1924, he had the opportunity of studying closely three typical examples of coronary thrombosis and its clinical syndrome. Apparently there was a considerable American literature on the subject. In 1925 he wrote about the condition in this country, and later Dr. John Parkinson and Dr. Evan Bedford did likewise.

When the clinical syndrome and its variations became known a number of instances were recorded; he had seen four cases in the practice of a single general practitioner. He was sure that the question of coronary thrombosis would often arise as a problem of diagnosis in general medicine, or even in general surgery, in patients in whom there had been no previous reason to suspect disease of the heart or vascular system at all. As to the reason this important cardiac disease had been so long missed out of text-books in this country, and by clinical teachers, he thought it was because such great teachers as Mackenzie, Allbutt, and Osler did not separate coronary thrombosis from angina pectoris. It was clear from the books of Clifford Allbutt that many of the cases included by him as "status anginosus" were really instances of coronary occlusion. Yet it was very important to distinguish coronary thrombosis from angina pectoris, because course and prognosis differed so widely. Typical angina pectoris was a fairly frequent precursor of coronary thrombosis, but after the thrombosis all further true anginal attacks usually ceased. The anterior descending branch of the left coronary artery was the vessel most commonly thrombosed; this branch carried blood to the apex of the left ventricle, the left anterior third of the right ventricle, and part of the interventricular septum. Hence thrombosis in it caused an infarction involving both the left and the right cavities of the heart, and mural thrombi occurring on the infarcted area might pass as emboli either to the lungs or to the systemic circulation. Levine had shown that the predisposing causes of coronary thrombosis were the conditions which brought about arterial degeneration; certainly a part, too, was played by a hereditary tendency to arterial disease. Angina pectoris was a common precursor. The male sex suffered from coronary occlusion rather more than the female. Rarely was it seen before the fortieth year.

The Clinical Syndrome.

The following classification of cases into six groups had been suggested :—

(1) Those in which death followed immediately on the occlusion. (2) Those in which death occurred a few minutes, hours, or at most a few days after the occlusion. (3) Those in which grave symptoms of myocardial insufficiency immediately followed the accident, but death was postponed for weeks or even months. (4) Those with grave symptoms easily recognised, but from which, after a stormy course, the patient recovered. (5) Those without grave manifestations, but with symptoms sufficiently definite to be recognised. (6) Those with only mild and uncertain symptoms, in which only a suggested diagnosis could be made.

It was difficult, therefore, to decide what was a "typical" case, but those of most clinical interest were the ones which survived. There was often a history of previous angina pectoris or anginal signs, though an attack might occur in a person who had never previously been ill. Its onset was sudden and was not in any way associated with effort on the patient's part. Pain was not a constant feature, but it was present in the majority of cases. It was sudden, sharp, knife-like, but differed from that of angina in its constancy and duration. It might continue for hours, even for several days. Its distribution was irregular and peculiar, and this accounted for many diagnostic errors; it might even be in the epigastrium, and in the right or left upper abdominal quadrants, so that perforated gastric or duodenal ulcer might come to mind. The pain might remain local, or might radiate in any direction, and in its area muscle tenderness might be extreme. Morphine, even in large and repeated doses, gave quite inadequate relief. Dyspnœa always occurred. The face took on an earthy colour, with a light cyanosis; the blood pressure fell rapidly, and the aspect was that of a patient with acute shock. Vomiting was common. As a rule, fever began 24 hours after the onset, and the temperature might reach 102° F. The leucocyte count might be 20,000.

In the 143 cases recorded by Levine, of which the outcome was known, 76 were fatal (53 per cent.), excluding the cases of sudden death seen by the coroner, and the mild undiagnosed cases. A number of patients survived for several years.

Amyl nitrite and other forms of treatment for angina pectoris were useless for this condition. Morphine must be freely given, even up to a grain in a few hours; and at a later stage treatment of the cardiac failure might be essential, when digitalis, &c., could be used. Oxygen was useful for the cyanosis. A long rest in bed was essential—six to eight weeks—and a long convalescence.

Cardiovascular Signs.

Dr. JOHN PARKINSON said that coronary thrombosis could often be diagnosed with confidence even when cardiac signs were absent. And surprise need not be felt at finding a pulse-rate little, if any, above the normal; it might be about 80 or 90. Such irregularities as auricular fibrillation were only occasional. Auscultation was almost worthless unless there happened to be a pericardial rub as a result of the infarct; this valuable sign, however, was often lacking. The heart sounds could be described as distant, but the value of this was, of course, slight. A striking feature usually was the fall in blood pressure, which might be as low as 90 to 100 mm. of mercury, systolic. This fall was not invariable, and in patients with a previously high pressure the fall might still leave a figure above the normal during an attack.

It was this common absence of physical signs which gave to the electrocardiogram a special value in this condition of cardiac infarction; in many cases its aid alone would clinch the diagnosis. Admittedly in a few cases the curve appeared normal, though there could be no doubt the case was one of true cardiac infarction. In a few cases, too, the changes in the graph did not appear until the subsidence of the attack. Further, the pre-existing electrocardiogram might have been abnormal—perhaps because of a previous infarct—and so the immediate change might be difficult to identify. Despite these occasional occurrences, however, the electrocardiogram was of the greatest value.

Dr. Parkinson objected to the term "coronary T wave," because the interpretation was not so simple as it implied. Admittedly there was a characteristic and peculiar T wave with a curve preceding the depression, but it might be only temporary. Simple inversion of a T wave in leads I. and II. could occur under digitalis, in aortic stenosis, or after diphtheria. The real electrocardiographic signs of coronary thrombosis were as follows: In the first stage the R–T period was raised—or possibly lowered—from the isoelectric line in a remarkable way. In the second stage this plateau was followed by a deep inversion of the T wave. The third (or convalescent) stage showed a gradual return towards the normal. Dr. Evan Bedford and he had distinguished two main types. The first was the T1 type, in which inversion was chiefly in lead I., less if any in lead II. In the second, the T3 type, the inversion was greatest in lead III., and less in lead II.

The underlying disease in these patients was arterio-sclerosis. Apart from palpation of the radial and brachial arteries and examination of the retina, there were few direct signs of this disease, but radioscopy now furnished means of observing the size and shape of the aorta. Present knowledge of coronary thrombosis had greatly simplified the problem of angina pectoris itself. The coronary arteries could be affected by atheroma of a degree sufficient to induce angina, but only on effort. Then, if thrombosis happened to occur at a spot in the narrowed lumen, a cardiac infarct ensued. In that way coronary thrombosis might initiate, complicate, or terminate the ordinary angina of effort. It was now considered that the outlook after an attack of coronary thrombosis was better than was formerly supposed. Very often a healed infarct had been found in a heart which ultimately failed or gave way to a later infarct; and there were histories of clinical cases 10, even 15, years before. It seemed, therefore, that a good general prognosis could be given for patients who were properly recovering from one isolated cardiac infarction.

Post-mortem Findings.

Dr. W. G. BARNARD said that the first recorded case was in 1543, under the title "cardiac aneurysm of the left ventricle." From experimental evidence it seemed clear that the condition proved suddenly fatal because there was some upset in the normal myocardial rhythm which threw it into a state of fibrillation. Why this followed coronary occlusion was not yet known; but if the patient survived some infarction resulted. The first change seen in the myocardium after occlusion of the artery was a slight swelling, and a change in colour from red-brown to a glossy purple. In sudden deaths, however, no such change was seen; there had been a blocked coronary artery. If the patient survived, almost all the infarcted tissue liquefied and was removed, and then the granulation tissue became more dense and less cellular, finally leaving a scar. As a result of this scar there was dilatation of the left ventricle, varying in degree with the size of the affected area. One of two accidents might happen: during the stage of infarction the heart might rupture through the pericardium, or the aneurysm might rupture. If the patient recovered, some organisation ensued. In syphilitic aortitis the coronary arteries were affected at their orifices, very rarely along their course, and it was still rarer to find fibrosis of the myocardium resulting from syphilitic disease of the coronary arteries, excluding gummata of the myocardium. The average age in syphilitic cases was much less than that in coronary thrombosis, where in a series of 35 cases it was 61.

Dr. F. J. POYNTON mentioned the close similarity of the symptoms of coronary thrombosis to those of

food poisoning.—Dr. F. PARKES WEBER did not agree there was an absence of literature dealing with the clinical symptoms of coronary obstruction; it was to be found under two headings: angina pectoris and status anginosus. The older contributions supplied the main basis for the coronary theory of the causation of angina pectoris.—Sir WILLIAM WILLCOX spoke of two cases of the condition he had seen, in one of which a toxin—that of trench fever—seemed to have played a part.

The PRESIDENT described a case in which abdominal pain was prominent. Even in very large doses morphia had no effect on it.

ROYAL SOCIETY OF MEDICINE.

SECTION OF ANÆSTHETICS.

AT a meeting of this Section on March 7th a paper on

SPINAL ANALGESIA WITH SPINOCAIN

was read by Mr. CHARLES DONALD. He recalled that spinocain was devised by Pitkin, of New Jersey, to overcome some of the difficulties encountered with the analgesics usually injected into the spinal canal. Pitkin, he said, claims for its absolute controllability over height, absolute maintenance of blood pressure, an almost absolute freedom from complications, and satisfactory analgesia in operations below the diaphragm. To this end he employs novocain as the least toxic analgesic, mixed with alcohol to make it a "light" solution, a viscous derivative of starch to limit absorption and diffusibility, and strychnine to act on the vaso-constrictors in the anterior roots. A separate administration of novocain and ephedrine is previously made into the track of the spinal needle, their respective effect being to prevent pain on passing the larger needle and to raise the blood pressure.

The solution, said Mr. Donald, has been given in 150 cases at the London Hospital and a smaller series, using crystalline neocaine and novocain, has also been done. As regards control over the height of analgesia, the technique of dosage, expansion of the indiffusible medium before injection, and the assumption of the Trendelenburg position, Pitkin's recommendations have been followed and various modifications have been tried to test the claims. The statement that absorption is relatively slow appears to be correct, for the equivalent amount of pure novocain gave, as a rule, greater analgesia. The use of the Trendelenburg position seemed only to cause a slight delay in the analgesia reaching the average height it attained if injected into a patient in the horizontal position. The same can be said of the indiffusibility. Waywardness in extent occurred as with other analgesics, and those in whom there was much over-action comprised the old, the very ill, and the flabby. Dosage and the type of patient were the only two recognisable factors. Out of 54 cases in which careful readings of blood pressure were taken, 17 had a fall of more than 20 mm. Hg. In seven the fall was 50 mm. or more. The fall was in no way proportional to the height of analgesia and therefore not to the number of anterior roots involved. In 18 of the cases analgesia reached to the second rib or higher; in only six was there a fall of more than 20 mm.; in several of these the pressure actually rose. Strychnine has never proved itself in these cases. Ephedrine does not prevent a fall, but as recovery is taking place there is apparently a quicker restitution to normal. The cases which showed falls in pressure were prostatectomies, gravely ill patients, cases of severe peritonitis, and a very few cases of simple operations. In the last the fall might be attributable to psychological causes.

There were certainly very few complications, said Mr. Donald. One moribund patient died on the table, but it is to the credit of spinocain that others in like state did not. Old, shocked, or toxic they took it well. There have been no palsies and only four severe headaches. Post-operative vomiting has been rare, much rarer than with novocain or neocaine, but the claim of rapid emptying of the bowels and non-occurrence of ileus has not been substantiated. The dose of spinocain can be pushed to cover higher abdominal operations, but then occasionally pain is complained of, and there is retching during the intra-abdominal manipulations. Failures have been met with after a long series of successes, and it is possible that the novocain may have deteriorated in solution. Spinocain has not justified its major claims as to the controllability and maintenance of blood pressure, but the results confirm Koster and Kasman's experimental and clinical observation that respiratory and blood pressure dangers have been overestimated—at least when neocaine and novocain are used and the Trendelenburg position is employed during the operation.

Dr. W. HOWARD JONES read a paper on

Percain: A New Regional and Spinal Anæsthetic.

Spinal analgesia, he said, results either from simple intradural caudal block or in the dorsal region thoracic nerve root block. The nerve trunks of the cauda equina are directly accessible to a needle through any of the lumbar interspaces; the thoracic roots are remote from the needle point and in the past have been reached by the following methods: (1) Gravitational diffusion resulting from the injection of a solution relatively heavier than the spinal fluid. (2) Barbotage or mixing the dose in the syringe with spinal fluid and repeated withdrawal and reinjection of fluid, usually completed by gravitational diffusion. (3) Replacement of a large quantity of spinal fluid withdrawn into a syringe containing the dose of drug, also likely to be completed by gravitational diffusion.

A New Method.—The method now advocated is that of treating the subarachnoid space in the same manner as the tissues and injecting it under pressure without withdrawing any cerebro-spinal fluid to the limit required by the operation. The volume dosage has been arrived at in the adult by injecting a series of consecutive cases with increasing quantities of solution and recording the levels reached. Extreme accuracy is not essential; splanchnic block requires that the solution shall pass the roots of D 5, but it must not reach the cervical roots, especially the main phrenic roots of C 4. A satisfactory level to reach is D 2 or D 3. The adult spine varies in length; a variation of about four inches has been found in the measurement between the inter-iliac line and the seventh cervical spine, in full flexion. The volume dosage for splanchnic block has been between 15 and 20 c.cm. of solution proportional to a relatively short or long spinal tube. Lower levels are reached by correspondingly smaller volumes of solution.

A New Drug.—For the first time in the history of spinal analgesia a drug is available which is potent in such high dilution that the amount dissolved adds next to nothing to the specific gravity of the vehicle. For thoracic nerve root blocks percain solutions of 1–2000, 1–1500, and 1–1000 are used according to the duration of analgesia required. The solvent has been normal saline 0·9 per cent. and 0·5 per cent. saline. The specific gravity of normal saline solutions is 1·006 in all three strengths. That of the 0·5 per cent. saline solutions is 1·003.

Cerebro-spinal Fluid.—The specific gravity of the cerebro-spinal fluid varies between 1·003 and 1·010, the more usual being probably 1·005–1·008. This variability is the most important thing to recognise and remember when using the method under consideration. Comparing percain solutions with these figures it will be seen that normal saline solutions may be hyper-, iso-, or hypobaric and that they will be frequently hypobaric. The 0·5 per cent. saline solutions (spec. grav. 1·003) will almost certainly be hypobaric. If a normal saline solution should turn out to be hyperbaric the danger to the patient in the

Trendelenburg position depends upon whether a short or long column of solution has been created within the dura. Inconvenient spread may take place from a large injection even if only slightly hyperbaric. An isobaric solution will stay where it is put.

Behaviour of a Hypobaric Solution.—These solutions have revealed for the first time the characteristic action of a genuine "light" solution. The condition which results in the dorsal decubitus is a preponderating anterior root block with little or no effect on the posterior roots, thus the entire abdominal musculature may be paralysed, yet the patient will be in an inoperable condition unless a general anæsthetic is given. This effect is also recognisable when towards the end of a long operation the patient feels pain but no rigidity accompanies it, and closure of the wound in the abdomen is effected without difficulty. Another demonstration is the greatly exaggerated peristalsis amounting to spasm, due to the more effective paralysis of the efferent inhibitory fibres of the splanchnics contained in the anterior roots. All this occurs in spite of the fact that sensory fibres are more easily affected than motor fibres. It is thus evident that the percain solution has applied itself in greater concentration to the anterior roots than to the posterior. This preponderating anterior root effect is in striking contrast to the preponderating posterior root effect of the small volume heavy solutions spread by gravitational diffusion, and shows a reversal of results. It is therefore necessary when using hypobaric solutions to put the patient in the ventral decubitus after injection in order to soak the posterior roots and develop analgesia, and when he is finally turned on his back the anterior roots will be affected and muscular paralysis follows. He is safe from spread when prone, for the neck will be lower than the upper dorsal region; but when turned on his back the slight Trendelenburg position should be adopted for a time as a precaution. As it is impossible to know beforehand the specific gravity relationship of the normal saline solutions, it will probably be better practice to use in all cases the definitely hypobaric 0·5 per cent. saline solutions (spec. grav. 1·0034) in all strengths of percain, never omitting the technique of the grill-room chef. Strictly limited caudal blocks are possible with small volume hypobaric solutions of percain, which may be used in higher concentrations for this purpose, relying on dilution in the cerebro-spinal fluid but even 6 c.cm. of 1–1000 solution between L4 and L5 may leave the greater part of the lumbar plexus unaffected. These effects of hypobaric solutions constitute a strong criticism of the pseudo-hypobaric spinocain, which although of low specific gravity in the ampoule, can only act in the same way as a heavy solution when mixed with cerebro-spinal fluid, and the clinical results of which are eloquent of gravitational diffusion—viz., preponderating posterior root effect and diminishing concentration from below upward.

General Effects of the Injection.—There is a fall of blood pressure due to vaso-motor paralysis. The fall is not nearly so great as after large doses of novocain, and this is because the high dilution of percain renders sudden absorption into the blood stream impossible. Novocain collapse is due chiefly to general poisoning by the drug following rapid absorption from the more concentrated solutions necessary for effective results. The percain patient, therefore, remains in much better condition on the operating table than those who have had novocain. Ephedrine gr. 1 to 1½ may be given in all cases. Analgesia can be obtained which outlasts the longest abdominal operation.

Respiratory Failure.—The phrenic nerve roots are not likely to be reached directly by these volume doses. Central failure is a possibility which must be watched for especially toward the end of a long operation. The more effective paralysis of the anterior roots of the intercostal nerves results in pure diaphragmatic breathing, and a virtual impediment to respiration causing fatigue of the centre. Shallow breathing, imperfect ventilation of the lung, and anoxæmia operate as a vicious circle progressively increasing central fatigue and tending to arrest. If narcotics have been given this tendency will be much greater. Carbon dioxide and oxygen is the correct treatment, and any dusky colour in the patient is an indication for oxygen. If a combined general anæsthetic is used the closed method with oxygen is an insurance against respiratory failure. Failures with percain will be failures of technique. After-effects are the usual symptoms of "meningism," headache, and vomiting experienced occasionally after other drugs and even after simple puncture.

There have been no disastrous consequences from percain injections, said Dr. Howard Jones in conclusion, and there is little reason why there should be. The maximum dose of 20 mg. required in the spine compares favourably with the 100 to 200 mg. used in the tissues, and 7·5 to 10·0 mg. are more effective than 150 mg. of novocain.

MEDICO-LEGAL SOCIETY
AND
WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

AT a joint meeting of these Societies held at 11, Chandos-street, on March 7th, Lord RIDDELL, President of the Medico-Legal Society, took the chair, and a discussion on

THE DOCTOR IN THE LAW COURTS

was opened by Sir WILLIAM WILLCOX. A medical practitioner, he said, might be called as an ordinary or as an expert witness. Even in the former case he was often asked to give an opinion; he should always ask to be excused if he was not absolutely sure of his ground, and the judge would probably support him. In giving evidence of fact he should avoid technical terms as far as possible, and should not make comments. The expert's true function was to assist the court, and he should be absolutely free from bias; this was supremely essential in criminal cases. Before coming to court he should study carefully the most recent literature of the subject; turn and turn over in his own mind every aspect of the matter, and cross-examine himself as severely as possible from the point of view of the other side. Written reports should contain nothing that the witness might have to repudiate afterwards. Sir William was strongly in favour of a separate preliminary conference between the experts called on each side, to clear up doubtful points and enable them to arrive at complete agreement. This was of great help to the court. Answers to cross-examination should be as concise and clear as possible, and the witness should avoid long explanations and evasion of the direct answer. Where he could not answer yes or no, he should give his reasons clearly and courteously. If the question were multiple, he should, if necessary, ask that the component parts of it be put separately. When statements in books or reports were put to him, he should ask to see the document before replying. An expert witness was usually required to attend in court during the whole case, for it was sometimes necessary to question him on his opinion concerning the evidence in general. Coroners' courts admitted much hearsay evidence, but the doctor should refrain from giving it. On the question of professional secrecy, Sir William thought that the confidences of a patient were sacred. They should only be divulged on the direct order of a judge, and then only under strong protest. Finally, the medical witness should not try to introduce points from his report that his counsel did not raise; there might be a special reason for the omission.

Privilege.

Lord RIDDELL said that many doctors envied the lawyers what they believed to be their privilege. The lawyer was not entitled to any privilege; the privilege

was that of the client. He alone might say what his lawyer might or might not disclose. This right, however, was very limited, and did not protect a client charged with a crime. A maxim that Sir William had not mentioned was "He who vegetates in the witness-box is lost." The professional witness must have all his wits about him, and it was also a great advantage to look simple and honest. Moreover, a good-tempered witness was very difficult to shake, but one who was conceited or vain was in considerable danger.

Sir WILLIAM COLLINS remarked that the Regulations made under the Venereal Diseases Act had laid down that information conveyed by the patient to the doctor should be absolutely confidential and privileged; a doctor had nevertheless been compelled by the judge to violate such a confidence. He himself should have preferred to resist, even to the point of being committed for contempt of court. The reason why priests were never required to reveal the secrets of the confessional was that they would certainly choose the alternative of imprisonment. The judge should have the right to the doctor's evidence in many criminal cases, but in cases within the mental and moral arena the doctor should refuse to violate the patient's confidence. He did not think that consultations between the expert witnesses on both sides would serve the ends of justice. He thought that the medical man would be much improved as a witness if a course of formal logic were part of the curriculum for a degree.

Dr. F. TEMPLE GREY commented on the absence of uniformity in the views of the medical profession on the question of secrecy as expressed at various times, and suggested that the British Medical Association and the Medico-Legal Society should together formulate a code of conduct for the guidance of younger members of the medical profession in these matters. The view that medical confidence should be absolutely privileged was no fantastic one and was law in France. The absence of such a provision in English law might, however, be regarded as a compliment to the reticence of the profession in this country. The Hippocratic oath bound the doctor not to divulge anything that ought not to be divulged, a qualification which was often forgotten. If the law required certain evidence, then that evidence ought to be divulged, and the question was whether the law ought to be changed. He agreed with Sir William Collins that the time was ripe for some form of compromise. He proposed that disclosure should be limited to evidence of fraud, crime, and matters in which the public interest demanded disclosure. It was in the public interest that the confidence of the venereal patient should be protected as much as possible. Patients treated in venereal disease clinics should be known only by numbers.

Mr. W. MCADAM ECCLES exhorted expert witnesses to stick to the truth, and to appeal to the judge if the form of the question made this impossible. The "whole truth" demanded that an expert witness should be completely impartial. It was a defect of the practice of the courts that medical practitioners were regarded as all on the same plane; it should be recognised that the value of their opinions differed considerably on different subjects. Mr. McAdam Eccles was against conferences of experts, but advocated that the expert witnesses on either side should have an opportunity to confer with the medical assessor or referee. The judge, in his experience, frequently attended at such a conference.

Lieut.-Colonel C. T. SAMMAN said he did not agree that the medical witness suffered financial loss through attendance at court.

Dr. A. KNYVETT GORDON held that no pathologist should ever give evidence on the significance of any tests he made unless he had seen the patient, for the error precluded certainty.

Dr. JULIUS BURNFORD pointed to the success of the preliminary conferences which had been the rule at Leeds owing to the determination of Sir Clifford Allbutt. They had eliminated the unseemly disputes between doctors and lawyers which were common elsewhere.

The CHAIRMAN commented shortly on some of the points that had been raised.

EDINBURGH OBSTETRICAL SOCIETY.

AT a meeting of this Society on Feb. 12th, with Dr. H. S. DAVIDSON, the President, in the chair, a paper on

Chronic Infection of the Cervix

was read by Dr. JAMES YOUNG. The condition, he said, was ten times more common in parous than nulliparous women, and the chief cause was damage of the cervix during labour. Gonorrhœa was the next most important cause. The most characteristic pathological feature of the condition was its intractableness, and this was due to the structure of the endocervix and to faulty drainage. The two most constant clinical features were leucorrhœa and pain. Menstrual irregularity and excess, bladder and bowel troubles, and general ill-health with arthritis and cardiovascular disease were also common. Dr. Young believed that chronic cervicitis was, with the possible exception of vaginal prolapse, the most common gynæcological cause of pelvic and abdominal pain. The chief site of this pain was the iliac fossa and the sacro-coccygeal region, and, as a rule, its relation to the cervix could easily be determined on vaginal examination. In health, displacement of the cervix laterally, antero-posteriorally and upwards could be produced with the vaginal fingers without inducing pain. In cervicitis fixation of the cervix was common, and any attempt at displacement immediately called forth the low abdominal or back pain. Many women suffered from nausea and, in such, retching was often caused by the same manœuvre. Dr. Young suggested that the pain was caused by irritation of the local sympathetic fibres and the somatic registering of these irritant impulses via the central nerve connexions. The iliac fossa pain of cervicitis was apt to be attributed to appendicitis or ovarian or tubal mischief. Treatment directed solely to the cervix often led to a cure of the menstrual abnormalities, and these were probably to be explained by a reflex influence on the ovaries through the sympathetic with consequent aberrant ovulation. Dr. Young discouraged vaginal douching as a treatment of cervical infection. It rarely did good, and it often did harm. Caustics and diathermy had been equally inefficacious in his hands. The lesion—dependent, as it was, on faulty drainage—could best be treated by thorough dilatation of the cervix and application of the cautery from internal to external os. Six long longitudinal smears were usually sufficient with, in addition, an individual and deep puncturing of any Nabothian follicles. The after-results showed that with a single cauterisation carried out thoroughly, cure or relief of the leucorrhœa and pain could be obtained in 70 to 80 per cent. of the cases. Relief of the other symptoms (menstrual, vesical, &c.) usually followed, and cases showing a dramatic arrest of an active and progressive arthritis were recorded.

Dr. TURNER and Dr. JAMES DAVIDSON communicated a paper on

Symmetrical Necrosis of the Renal Cortex.

Two cases in Dr. Turner's practice were described. Both the patients were multiparæ; one, aged 37, had had four children, and the other, aged 39, had had three. Both were delivered of macerated fœti at the seventh month of pregnancy. In the first case there was an antecedent history of pre-eclamptic toxæmia and accidental hæmorrhage, but in the second no abnormality was observed during the antenatal period. Both patients lived for 12 days after delivery, and during this period the urinary secretion diminished (19 oz. in the first and 8 oz. in the second case). In both cases there was a comparative absence of

symptoms. Up till the eighth and fifth days respectively the only noticeable features were partial suppression of urine and gradually increasing generalised œdema. The puerperium were afebrile in both. On the eighth and fifth days uræmic phenomena began to appear, but were slight in degree, and consisted, firstly, of progressive drowsiness, stupor, and ultimately coma; secondly, of dyspnœa; and thirdly, in the first case, of uræmic vomiting. Both patients died without having convulsions. Treatment was on general lines—free elimination, diaphoresis, and administration of diuretics—but without benefit. In both cases the kidneys showed the same characteristics—namely, total necrosis of the outer two-thirds of the cortex, the inner third being healthy, and slight congestion of the medullary portion. In neither case was there thrombosis of the renal vessels, nor was there any evidence of previous nephritis. In the first case the liver presented areas of focal necrosis of the central zone cells of the lobules.

Dr. JAMES DAVIDSON showed specimens of kidneys from three cases of bilateral cortical necrosis of the kidneys. One of these was from one of Dr. Turner's cases. The second showed the earliest changes of this condition. Thrombosis of the afferent arterioles of the glomeruli was well seen in microscopical sections. The third case showed advanced stages of necrosis and was of interest because there was ante-mortem thrombus formation in both ovarian veins. He pointed out that there had been one case previously described in literature where naked-eye thrombosis had occurred in both renal and ovarian veins. Dr. Davidson referred to a case which was reported some years ago of a man, aged 37, whose kidneys showed a typical appearance of bilateral, cortical necrosis.

Reviews and Notices of Books.

AFFECTIONS OF THE EYE IN GENERAL PRACTICE.

By R. LINDSAY REA, M.D., F.R.C.S., Surgeon to the Western Ophthalmic Hospital; Ophthalmic Surgeon to West End Hospital for Nervous Diseases. London: H. K. Lewis and Co., Ltd. 1930. With 7 coloured plates and 33 other illustrations. Pp. 155. 10*s.* 6*d.*

Mr. Rea dedicates his book to the general practitioner. The volume is in no sense a text-book of ophthalmology, but is well calculated to help the practitioners who have but a superficial knowledge of eye diseases to overcome the difficulties which may confront him from time to time. The outcome, founded on the experience of many years of clinical work at an ophthalmic hospital and at a hospital for nervous diseases, is essentially practical; the teaching is brightened by frequent reference to actual cases. In the main the instruction is on orthodox lines and does not include reference to such recent developments in ophthalmology as, for example, the newer pathology of glaucoma; but here and there are references to points not found in ordinary text-books. The method of irrigating the eye by the hydr-ophthalmoscope of Rayner Batten is not nearly so well known as it deserves to be; an illustration in this book shows how this instrument can be used. Some years ago Mr. Rea published a monograph on interstitial keratitis in which he strongly advocated specific anti-syphilitic treatment in this disease, a point of view not held by many writers of text-books. His arguments are here reproduced and emphasised. According to him many of the cases of interstitial keratitis with a negative Wassermann reaction which were formerly supposed to be tuberculous in origin can be proved to be syphilitic if Lange's colloidal gold test is employed. The author gives a series of intravenous injections of novarsenobillon to these patients in graded doses, or to young children sulf-arsenol intermuscularly, the series being repeated if necessary. Not one of 64 cases treated from the outset in this way developed deafness, whereas in untreated interstitial keratitis deafness is common.

In a book of this sort any description of the operative surgery of the eye would be out of place, but there are certain emergencies in which it is of the first importance for the general practitioner to know what is the wrong, no less than what is the right thing to be done. The onset of acute glaucoma is one of them. Another is the occurrence of a perforating injury of the eye. In this, time may be all important, in order that septic infection may, if possible, be prevented. Mr. Rea gives details of a method of covering the cornea with a conjunctival flap which he demonstrated a few years ago at the Royal Society of Medicine. The plate illustrating the procedure should be of value to the ophthalmic specialist. The book includes, as is fitting, a chapter on the examination of the eye in nervous diseases, one on the hygiene of the eyes, and a supplement with useful therapeutic formulæ.

The production and illustration of the book are excellent, and the general practitioner to whom it is dedicated will find that it supplies his needs in good measure.

COMMON INFECTIONS OF FEMALE URETHRA AND CERVIX.

Second edition. By FRANK KIDD, M.A., M.Ch. Cantab., F.R.C.S. Eng.; and A. MALCOLM SIMPSON, B.A., M.B., D.P.H. Cantab. With additional chapters by GEORGE T. WESTERN, M.D., and M. S. MAYOU, F.R.C.S. London: Humphrey Milford, Oxford University Press. 1929. Pp. 197. 8*s.* 6*d.*

APART from an additional chapter on recent advances in technique and a few minor alterations this book is, in its second edition, unchanged. Although other infections of the female urethra and cervix are mentioned, the book is essentially concerned with gonorrhœa in the female, and the fact that no considerable alterations have been found necessary indicates that the authors' methods of diagnosis and treatment of gonorrhœa in the female have stood the test of time. The use of Frank Kidd's urethroscopes in the treatment of chronic urethritis by the application of local remedies to the urethra under direct vision is explained: the value of such treatment in resistant cases is now generally recognised and is entitled to the prominence it receives. Cervicitis is classified simply and the treatment applicable to each type of cervicitis is discussed. The paragraphs on chronic cervicitis are the best we have ever read on this subject. The chronic cervicitis, type 2, here described, in which the cervix is apparently healthy with no erosion, or in which there is "a pale erosion and a tear, but clear jelly-like mucus free from pus is seen issuing from the canal," is at once the most frequently missed and the most difficult to treat of all the chronic gonococcal lesions. It is of interest to learn how the authors treat such cases, and to learn the importance which they attach to the diagnostic procedures of tubal insufflation and of lipiodol injection in the most resistant cases.

For the rest, the chapter on prophylaxis is fearless and sensible, and that on bacteriology contributed, as before, by Dr. George T. Western, describes lucidly the pitfalls which may be encountered in bacteriological diagnosis. The warning against the use of the diathermy by all but the most expert, particularly in the treatment of urethritis, is reiterated. Dr. Remington Hobbs's treatment (glycerin and iodine with glycerin) is given its proper place, being reserved for cases of acute or subacute endometritis and for cases of resistant chronic cervicitis in which tubal infection is suspected. The authors are against the indiscriminate use of this, or, indeed, of any one form of treatment. The excellent chapter on gonococcal arthritis in women enunciates the correct principles in the treatment of joint infection. Early and active movements of the joints are essential, and the authors point out

that "there are still too many cripples to be seen as the result of the splint and plaster treatment." More space might perhaps have been found for a full discussion of the importance played in gonorrhœa by the secondary organisms.

In an easy, attractive style the needs of the practitioner are kept in mind throughout. The book should be read by him, by the specialist, by the student of medicine, and, most important of all, by the confirmed pessimist. The last named is all too common where gonorrhœa in the female is concerned. The London Hospital deserves congratulation on its Department for Venereal Diseases.

OTOLOGIC SURGERY.

Second edition. By SAMUEL J. KOPETZKY, M.D., F.A.C.S., Professor of Otology, Polyclinic Medical School and Hospital, New York. New York: Paul B. Hoeber. 1929. Pp. 553. $8.00.

THIS book contains very much more than a description of surgical operations on the ear and its adnexa, for it is largely concerned with the diagnosis and clinical course of all forms of aural disease which require surgical treatment, omitting only such affections as otosclerosis and the so-called catarrhal conditions which do not call for operative interference. A preliminary chapter is devoted to a discussion of inflammation of the middle ear and mastoid cavities. The author lays stress, rightly we think, on the participation of the mastoid cells in all cases of acute purulent otitis, and states that radiological examination substantiates this view. He divides acute mastoiditis into two forms, the common coalescent type and the hæmorrhagic type; the former may reach the lateral sinus by continuity, when it shows a track of disease leading to the sinus groove; but the latter infects the sinus by intravenous extension of thrombosis along the tributary veins, and may therefore show no evidence of disease of the bony walls. The author may not be justified in the conclusions he draws from the fact that he has found sterile pus in the mastoid process. It will be remembered that Mr. T. B. Layton, in the *Journal of Laryngology* for January, 1930 (p. 25), has recently ascribed this occurrence to the bactericidal action of the admixture of blood on the swab, since in the same cases he obtains positive results from direct culture of a fragment of bone.

Prof. Kopetzky writes briefly on operations on the external auditory canal, incision of the membrana tympani, and operations on the middle ear through the meatus. He holds that experience and time have demonstrated the futility of ossiculectomy for the cure of chronic suppuration, and that this procedure has failed as a means of improving the hearing of patients with chronic non-suppurative otitis. The simple and the radical mastoid operations are very thoroughly discussed, with a good description of the necessary anatomy, indications, after-treatment, and results. One curious passage occurs in which the author states that "accidental opening of the sinus or tearing of the dura is often absolutely unavoidable"; exposure of the dura over sinus or middle fossa may be unavoidable if abnormally situated, but injury to it can surely always be avoided. On the moot question of when to open the antrum in cases of acute suppuration which fail to clear up, in order to avoid chronicity, the author fixes the period at as long as two months, and stresses the value of the operation in the prevention of chronic otorrhœa. In dealing with the indications for the radical operation, emphasis is properly laid on the distinction between the dangerous and non-dangerous types of chronic suppuration, the former with attic or marginal perforation, and the latter with a perforation of the membrana tensa, which does not involve the bony tympani ring. The author does not believe that the "modified" operation can heal necrotic areas or restore a diseased ossicular chain, and that it offers no advantages over the simple mastoid operation. Further chapters deal with the labyrinth, sinus thrombosis, meningitis and cerebral abscess, with a chapter on laboratory aids, and one consisting of reports on illustrative cases; this chapter is one of the most interesting and instructive parts of the book. In pursuance of his design to confine the book to surgery, the author is sometimes disappointingly brief in his clinical descriptions. The illustrations, especially of operative procedures, do not do justice to the text, for they are insufficient both in quantity and in quality.

The book loses nothing by being written from a personal standpoint, and gives evidence of the author's extensive experience. It will be read with interest and profit by all otologists.

SHORT HISTORY OF THE ROYAL ARMY MEDICAL CORPS.

By Colonel FRED SMITH, C.B., C.M.G., D.S.O., R.A.M.C. (retired). Aldershot: Gale and Polden. 1930. Pp. 111. 2*s* 6*d*.

IN this short book the history of the R.A.M.C. is traced through orders and warrants from the Peninsula, a hundred years ago, to the present day, while the illustrations show the developments of uniform and of hairiness (there was clean shaving in 1805, tremendous whiskers appear in 1865). In the list of Directors-General, "James Jameson, 1893–1896," is alone in recent years left without the K.C.B. An unusual honour was given him, however—a notable dinner in London, attended by the Presidents of Colleges of Physicians and Surgeons of England, Scotland, and Ireland, and heads of Universities and Medical Schools who felt he had merited the approval of the profession. His resignation took place during the South African War, in 1901. It is noteworthy that no Medical Director-General has since found it necessary to resign.

In preparing this book, Colonel F. Smith has done very important work for the Corps, and his efforts will be welcomed by all those who are serving or have served in its ranks.

MANUAL OF PROCTOLOGY.

Third edition. By T. CHITTENDEN HILL, M.D., F.A.C.S., Instructor in Proctology, Harvard Graduate School of Medicine. Philadelphia: Lea and Febiger. 1929. Pp. 272. $3.50.

THE third edition of Dr. Chittenden Hill's well-known Manual of Proctology has now appeared and retains all the commendable features to which we referred when reviewing the second edition. He has presented a clear and practical description of proctological conditions and methods. His attitude in general is a conservative one and ambulatory methods are not over-emphasised. The evolution of the final chapter on cancer of the rectum is of interest. In the first edition this chapter was written by Mr. Ernest Miles, and the one-stage abdomino-perineal excision method was described. In the second edition Coffey's two-stage modification was described and illustrated in much detail, while in this edition the chapter has been written by Dr. E. Parker Hayden. The principle of the abdomino-perineal excision is upheld with the reservation that often it is too severe a procedure to be carried out in one stage, and what is known as Jones's two-stage modification is now described. No figures are given about operation mortality or recurrence rate. It is interesting to note that Broders's system of classification of malignancy has now been applied to carcinomata of the rectum, and attention is drawn to work by Rankin and Broders showing that long-term cures after radical operations occur almost entirely in patients whose cancers were of low or medium malignancy. The author's opinion of radiation is summarised in half a page; he does not think that it is possible to cure an inoperable case by X rays or radium; most can be accomplished by gold emanation seeds; a

growth just above the sphincter is not suitable for radium treatment on account of post-radiation discomfort. A large group of surgeons is likely to agree with these conclusions.

BOOKS FOR NURSES.

Elementary Materia Medica. Including Drugs and Solutions. By WALTER W. KRUEGER, Ph.B., Instructor, The Grand Rapids Junior College. London: W. B. Saunders Co., Ltd. 1929. Pp. 278. 8*s*.

THE output from American sources of text-books for students of nursing is an indication of the attention which the authorities are giving to the training of nurses, but the books all suffer from the same defect; they contain far more information than a nurse in training can possibly assimilate. Mr. Krueger's book is not exceptional in this respect, though in some ways it is an interesting production. In addition to the usual chapters dealing with the elementary, and for the nurse important, aspects of materia medica, such as the administration of medicines, the therapeutic classification of drugs, and the preparation of solutions, the author has introduced a chapter of general interest in the form of a sketch of the historical background of modern materia medica. He recognises also that figures may not come easily to a nurse, so he has added a simple chapter on numbers, fractions, and decimals. The book is readable and accurate. The elaborate bibliographies at the end of each chapter could quite well be dispensed with. They indicate a want of appreciation of the actual requirements of a nurse's training.

Nursing Care of Communicable Diseases. A Text-book of Prophylactic Technics for the Prevention and Control of Disease. By MARY ELIZABETH PILLSBURY, Instructor of Communicable Disease Nursing, Yale University School of Nursing. 1924–27. London: J. B. Lippincott Company. 1929. Pp. 413. 12*s*. 6*d*.

MANY nurses come to the end of their hospital training with but a scanty knowledge of communicable diseases, and in this American manual they may find a useful text-book. It is written in an interesting style and contains much information about the American public health services, stressing the duties of the nurse as a teacher of the public in matters of health. The second part of the book is devoted to the discussion in separate chapters of the various better-known infectious diseases, each disease being viewed from the medical and nursing aspects. In connexion with scarlet fever, while throat irrigation is mentioned, there is no reference to spraying of the throat, which is usually found more effective for the relief of pain both in scarlet fever and diphtheria. The book is illustrated by photographs; some of these are useful in conjunction with the description of nursing technique; the black and white attempts at reproducing the appearance of skin eruptions are not successful. Blank pages for notes are provided at the end of the book; in a later edition these might be more conveniently placed in front of the index.

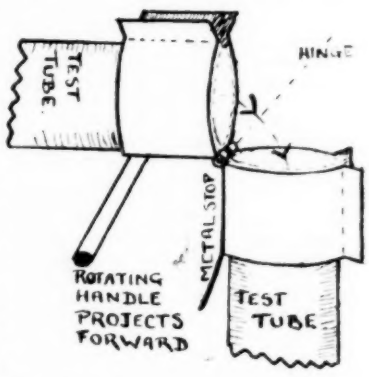
JOURNALS.

EDINBURGH MEDICAL JOURNAL.—The March issue is a special Tuberculosis Number. The first article by Dr. W. T. Munro, on Bovine-Type Tubercle Bacillus in Pulmonary Tuberculosis: Its Rôle in Pathogenesis, is annotated on p. 584.—Dr. D. Melville Dunlop writes on the Sedimentation Test in Tuberculosis, and on the Leucocytic Reaction to Tuberculosis, both in relation to their value in prognosis; and also has a third paper on the Relation between Glandular and Pulmonary Tuberculosis. In the first he comes to the conclusion we believe to be now generally accepted that the sedimentation-rate is an expression of the degree of activity of the disease, but is by no means infallible, and should never be taken alone as a prognostic index or as definite evidence of activity or inactivity. His second article on the leucocytic reaction contains the results of white cell counts from tuberculosis patients in the Southfield Sanatorium Colony. Here he notices that in health the ratio between the neutrophiles and lymphocytes is less than the ratio between the lymphocytes and monocytes. This picture is reversed in tuberculosis, and the more it deviates from the normal the worse the prognosis. In his third paper Dr. Dunlop reports that out of the last 68 cases of pulmonary tuberculosis which have been treated in the Colony, 13 have been associated with a history of disease of the cervical lymph glands, which represents a percentage of 18·9 as against 1 per cent. quoted by other authorities.—Dr. R. S. Begbie contributes a short paper on Microbic Dissociation, with special reference to Certain Acid-fast Bacilli, in which, following the lines of the work of Petroff, he has isolated rough and smooth colonies from cultures of B C G, the smegma bacillus, and Clegg's lepra bacillus.—A short note on Inoculation of Calf with Human Tubercle Bacillus, by Sir Robert Philip, Dr. J. C. Simpson, and Dr. Dunlop, records the successful production of tuberculosis in a calf by the ingestion of tubercle bacilli of human origin.—Two articles deal with social aspects of disease: one on Education of the Public in Health Matters, with special reference to the Work of the National Association for the Prevention of Tuberculosis, by Dr. William Brand; the other by Dr. A. Morrison McIntosh on Difficulties in Assessing the Capacity for Work of Ex-Sanatorium Patients.

New Inventions.

EXCRETA EXAMINATION DEVICE.

THE small device here illustrated facilitates the examination of excreta, and is inexpensive. It consists of a pair of metal clips united by a hinge. Attached to the right clip is a small metal "stop" which prevents the test-tubes touching each other. Projecting forwards from the left clip is a 10-inch rotating handle provided with a ring at end. Ordinary test-tubes are fitted into the clips. The advantages gained by this device are as follows: 1. The hands do not touch the test-tubes and so remain dry for the recording of results. 2. Burning and scalding accidents prevented when pouring. 3. Spurting when mixing is checked, the ejected fluid being received into the uppermost empty test-tube. 4. Thorough mixing of liquids the tubes may be shaken when horizontally opposed. 5. The appliance stands on the table like a tripod until reaction occurs. 6. The tubes are cleansed easily (together) under the tap and can be used singly or together. 7. The device hangs up when not in use. The makers of the appliance are Messrs. S. Murray and Co., Ltd., 11/13, Farringdon-road, London, E.C.



DAVID A. HERD, L.R.C.P., L.R.C.S. Edin.

THE LANCET.

LONDON: SATURDAY, MARCH 15, 1930.

CLINICAL RESEARCH AND EXPERIMENTAL MEDICINE.

It will probably strike any reader of the detailed summary of the year's work given in the Report of the Medical Research Council for 1928–29,[1] or in any of its predecessors, that most of the research work supported is conducted in laboratories, and that on the whole a very small part of it has been done by men engaged in clinical medicine. The Council themselves draw attention to this circumstance, and find therein a text for an admirably clear and fair review of the relation of medical research to clinical responsibilities. Is there, they ask, a science of experimental medicine of which the actual material for study is the human patient? Or is scientific work by the physician or the surgeon limited to the application in his art of scientific results worked out elsewhere in the laboratory and delivered to him for use? Certainly there is not yet in the field of clinical medicine any stabilised or organised branch of science with a system of recruitment and promotion in the Universities. In their attempt to define the position, the Council draw a clear distinction between the work of the physician engaged in practice and the work of a man engaged in the task of advancing knowledge. The expression of this distinction evokes at first glance that sense of indignant protest which modern psychology recognises as man's natural reaction to unacknowledged and unpalatable truth. The Council state boldly that the proper performance of either of these two kinds of work tends to exclude the proper performance of the other; that the training for one is compatible with the training for the other only along part of the way. The work of a physician, and still more of a general practitioner, is devoted essentially and primarily to the task of diagnosis (not diagnosis in general, but diagnosis of the state of the particular patient), and thereafter to the treatment suitable both to the body and to the mind of that patient. The physician needs good and trained powers of observation, as well as quick, intuitive decision that only inborn aptitude and long years of experience can bring. His skill is rooted, of course, in scientific knowledge, and in his art he will make every application of the latest results of science. In the interests of his patients, however, he will be unable to make the advancement of scientific knowledge a primary object.

The research worker in the clinical field, on the other hand, must take a different point of view and follow a different discipline. He must ignore individuality, obliterate it by multiplying cases, and study the disease process as such. His thoughts must be concentrated chiefly upon the task of getting new knowledge in his chosen inquiry by every experimental method open to him, whether at the bedside or in the laboratory. It is just here that his immense difficulty lies—that of deciding what experimental methods are justifiable. In facing it the Council are less outspoken than in their appreciation of the problems of the practising clinician. They say, "Since human beings are to be the material of his study, he must learn, of course, to deal with them with the same unselfish solicitude as that of any of his brother physicians." This, it may be held, is elementary medical ethics; but situations must arise where the conduct of a collective controlled experiment in therapeutics may interfere with the welfare of an individual, and then the duty of a physician to his patients must conflict with and hamper his zeal for experimental research. Certain peculiarly able men, ingenious enough to devise questions which involve few such struggles, or fortunate in that their tastes lead them to investigations where observations made on human beings can be tested on experimental animals, are contributing notable advances to scientific medicine, in which their results are hardly less rigidly controlled than any of those recorded in laboratory work. Among them one name stands out. The Medical Research Council recall that in 1916 the appointment of Sir THOMAS LEWIS, already a physician attached to University College Hospital, to be a member of their whole-time staff, with suitable assistants, initiated the first effective hospital unit in this country. Their claim that the output of work from this centre in the scientific study of the heart and blood vascular system, its disorders and their treatment, has constituted the central stream of progress made in these subjects in any country, will be generally admitted. By contrast with this achievement some disappointment is implied, though not actually expressed, with the output of the professorial clinical units in surgery and medicine attached to the medical schools. A decade has now passed since they were inaugurated with the object of giving higher and more advanced teaching as well as organising elementary instruction in clinical subjects. They were to impart to the more able students such qualities of trained critical judgment as would fit them for the best kinds of practice, while at the same time they were to train others for an academic life of scientific clinical research. The remarkable success with which the functions of clinical teaching have been performed is here acknowledged. But these important duties, and that of taking a fair share in the administrative work of the medical schools, have tended to divert energy from other tasks and have "necessarily limited the volume of spontaneous and successful research work" coming from the units in the aggregate. Reasons of another kind are also suggested for the fact that the assistantships, whether in these university units or in the research unit under Sir THOMAS LEWIS, have not hitherto produced many men able and willing to devote themselves to a life of clinical research in experimental medicine. One is the novelty of a career in which a man is neither exactly a physician nor exactly a laboratory worker. The other and weightier factor is the absence of stable positions in which such a career may be pursued and developed with proper facilities and with reasonable remuneration. A man well trained as a clinician as well as skilled in laboratory work is thus tempted to exchange the present uncertainty of promotion and ultimate reward in scientific clinical work either for the relative certainties of professional practice, or, if he has private means or simple tastes, for an academic career in these sciences ancillary to medicine where

[1] London: H.M. Stationery Office. 1930. Pp. 153. 3s. An account of some of the researches carried out in the year under review will appear in a future issue of THE LANCET.

professorial chairs are fairly numerous. These are certainly defections from the point of view of breeding whole-time clinical researchers, though for obvious reasons we should hesitate to deplore them if the succession were assured. A tendency at some of the great hospitals for the medical and surgical units to be regarded as recruiting grounds for the staff has been apparent; and this is certainly a useful way of gradually widening the scientific horizon of the honorary staff, a group whose outlook on medical problems has an incalculable influence on generations of students and therefore on British medicine. It is obvious, though, that if clinical research is to absorb a due amount of the annual grant of £150,000 placed in the hands of the Council for distribution, more men must be found who are permanently willing to devote their lives to this end. The conclusion reached by the Council is that

"there can never be a successful and maintained recruitment of young men of ability for clinical research until there are at least a few stable positions in sight, the occupation of which at middle age will provide reasonable remuneration and adequate power of educating a family. It was hoped originally that the directorships of the University clinics in London, with others that might be established elsewhere in the provinces, would provide posts sufficiently numerous and attractive to keep the abler men at the work of investigation with the ambition of succeeding to them. But a young man able enough to advance knowledge is not likely to be attracted by a post to which he might be appointed in the future if his occupation of it is to bring such burdens of teaching and administration as would greatly debar him from the very research work that it is his ambition to pursue."

The Medical Research Council are trying to meet the situation by a statement of their intention to encourage still further the scientific and direct study of disease in man. They wish to recruit for this purpose young workers of ability, to help them during a preliminary period of training and probationary work, and, when they are able, to select candidates whose training is adequate and whose efforts show promise to increase the number of clinical workers on their permanent staff.

We are impressed with the arguments in this carefully worded section of the Council's introduction to a masterly Report. No hint is given of the type of training to be offered, but doubtless this will follow the time-honoured lines of apprenticeship to one with knowledge of the difficulties involved, or association with a team of workers. Whatever form the discipline takes, it is to be hoped that an elementary grounding of statistics as applied to medicine will be imperative. Where the material available for study is so precious, and sometimes so difficult to come by, it is unjustifiable to waste it by planning work which, examined statistically, is of little value compared with the controlled observations that might have been made. Criticisms offered, and legitimately offered, on the outcome of laborious work which has extended over years are sometimes resented. It is pardonable to be disheartened if figures honestly collected are found to be meaningless, but not to condemn statisticians for exposing fallacies due to ignorance of proper methods. Where many unknown factors can be eliminated, as in a well-constructed laboratory experiment, the need is perhaps not so great; but the assessment of clinical research, to be economical, requires either great experience, natural ability, or some knowledge of the laws of probability and averages. A significant sentence in the section on Statistics (p. 123 of the Report) reads, "Much time and energy have again been used in giving statistical help to research workers in other departments." It is unlikely that a brief training in applied mathematics would make it possible to dispense with the assistance available from Prof. MAJOR GREENWOOD and his staff, but it might at least enable them to economise some of the "time and energy" so generously offered to other workers.

ÆTIOLOGY OF DISSEMINATED SCLEROSIS.

DISSEMINATED sclerosis is one of the commonest chronic diseases of the nervous system. In England it ranks second only to neurosyphilis in frequency; in Switzerland it holds the foremost place. But in spite of its prevalence its cause has hitherto remained in doubt. Until the present century even its pathological nature was much disputed. Histological study, however, tracing the "sclerotic plaque" to its earliest stages, has there discovered all the manifestations of inflammation in the nervous system, and increasing knowledge of neuroglia has led to the recognition of the glial "sclerosis" as an inflammatory reaction rather than a neoplastic hyperplasia. Hence disseminated sclerosis is now almost universally regarded as an encephalomyelitis characterised histologically by neuronal demyelination and clinically by its relapsing tendency. This conception has naturally led to the search for a causal organism, and to many conflicting observations. Some workers have claimed to have transmitted a neurotropic virus of unknown nature from cases of disseminated sclerosis to animals. Others have impugned a spirochæte. Many completely negative experimental observations have been recorded, and no positive claim has gained general acceptance. To-day we publish a paper by Miss KATHLEEN CHEVASSUT, bringing forward evidence in favour of the view that the cause of disseminated sclerosis is a filtrable virus which she claims to have isolated from the cerebro-spinal fluid of a large number of patients. This discovery, if it is substantiated, will certainly rank among the foremost achievements of bacteriology. Other bacteriologists will doubtless avail themselves of the opportunity of repeating Miss CHEVASSUT'S experiments. This, however, must take time. In the meantime it is desirable that her claim should be subjected to all possible well-informed and fair-minded criticism, and that hasty acceptance and rejection should equally be avoided.

Miss CHEVASSUT first describes some original observations upon the colloidal gold reaction in the cerebro-spinal fluid and blood-serum in disseminated sclerosis which she interprets as indicating that this reaction "is related in some way to the causal factor." She then brings forward evidence that "in a high percentage of cases of disseminated sclerosis there is deficiency in the antitoxic and metabolic functions of the liver." Both of these conclusions are open to criticism, but they have no direct bearing upon her main thesis. She reports that in a special medium, Hartley's broth to which human blood-serum has been added, she has succeeded in growing an organism which, when examined microscopically by a special technique, appears as spherical bodies, some of which have granules attached to them. She has cultivated this organism from the cerebro-spinal fluid of 176 out of 188 cases of disseminated sclerosis, and has found it present in all stages of the disease. She describes the conditions affecting its growth and has observed that it ferments glucose, lævulose, and mannito

The granules have been shown to pass through collodion membranes. These positive observations have been controlled by culturing the cerebro-spinal fluid from 269 persons suffering from other conditions, always with negative results. Miss CHEVASSUT, then, appears to have demonstrated the presence of certain bodies in cultures made from the cerebro-spinal fluid of patients with disseminated sclerosis. Is she entitled to conclude that these bodies constitute the causal organism of the disease? We must now consider how this conclusion might be criticised, not necessarily as incorrect, but as requiring further evidence before it can be regarded as proved. The bodies have never been demonstrated in the cerebro-spinal fluid itself. There may be good technical reasons for this, as Miss CHEVASSUT suggests, but if these difficulties could be overcome it would go far to remove the possibility that the supposed organisms may be products of the interaction of the fluid and the culture medium. It may be strange to regard the uniformity of the success of an experiment as evidence against its validity, but workers with the filtrable viruses may be inclined to regard the demonstration of the virus in 93 per cent. of the specimens examined as almost too good to be true, especially when the material is derived from quiescent as well as from active cases. It may be suggested that some biochemical change in the fluid is more likely to be thus constant than the presence of the organism. It seems desirable, too, that some attempt should be made to ascertain whether the virus is obtainable from nervous tissue as well as from cerebro-spinal fluid. It is naturally the aim of all who claim to have isolated an organism to transmit it to animals, to show that in inoculated animals it produces the symptoms and histological changes of the disease in man, and that it can be recovered and cultivated from animals thus infected. The evidence that these tests have been successfully carried out with Miss CHEVASSUT'S organism is at present inconclusive.

Sir JAMES PURVES-STEWART, in the paper on p. 560, summarises experiments which he has carried out in conjunction with Dr. BRAXTON HICKS and Dr. F. D. M. HOCKING, and which will be fully reported in our next issue. It is disappointing that more striking results were not obtained from such drastic inoculations as the intravenous and intracisternal injections of cultures of the virus into monkeys. Possibly the monkey is not a susceptible animal, though G. STEINER has described the successful inoculation of a monkey with the disease. Perhaps intracerebral inoculation would yield better results. There is nothing in Miss CHEVASSUT'S observations inconsistent with her view that she has isolated the organism of disseminated sclerosis, but the proof of her contention can hardly as yet be regarded as complete. We sincerely hope that further investigations will prove her right, and neither she nor Sir JAMES has spared pains in their admirable work.

We turn now to the practical applications of the observations we have been discussing. An exceedingly important one is entirely independent of their interpretation and, curiously, has not been mentioned either by Miss CHEVASSUT or by Sir JAMES PURVES-STEWART. Whether or not the *Spherula insularis* is the cause of the disease, if the existence of these bodies is confirmed their diagnostic value is clearly very great. A test applicable to the cerebro-spinal fluid which yields a positive result in 93 per cent. of cases and is pathognomonic of disseminated sclerosis, will be an even more valuable aid to the diagnosis of this disease than is the Wassermann reaction in neurosyphilis. It will be of great use in early cases, and also may be expected to throw light upon the relationship between disseminated sclerosis, neuromyelitis optica, and other forms of demyelinating encephalitis. The isolation of a causative organism suggests the therapeutic employment of an autogenous vaccine, and Sir JAMES PURVES-STEWART contributes a weighty paper setting forth the results achieved by means of killed cultures of Miss CHEVASSUT'S organism. He wisely emphasises the need of caution in drawing conclusions as to the effects of any therapeutic measure in disseminated sclerosis. His patients have apparently only been under treatment for one or two years, a time too short to permit one to speak with confidence of clinical arrest. The clinical improvement which occurred in the four cases fully reported is not greater than may occur spontaneously. Sir JAMES PURVES-STEWART lays stress upon improvement in the colloidal gold and globulin reactions in the cerebro-spinal fluid. The significance of these changes could have been better appreciated if controls had been investigated. J. D. AYER and H. E. FOSTER have observed spontaneous variations in the colloidal gold-curve corresponding to progressive and stationary phases of the disease, and ADAMS, BLACKLOCK, DUNLOP, and SCOTT have found a diminution in the curve following treatment with salvarsan. The disappointing feature of the vaccine treatment is the fact that after treatment the organism was still obtainable from the fluid in 62 out of 70 cases. This fact, of course, has no direct bearing upon the question of the specificity of the organism. The discovery of the tubercle bacillus and the *Treponema pallidum* has not led to the cure of tuberculosis and syphilis by means of vaccines. Disseminated sclerosis, another relapsing disease, seems to offer a rather unpromising field for such treatment, for natural immunity, at least, appears to be short-lived.

Miss CHEVASSUT, Sir JAMES PURVES-STEWART, and their collaborators have laid before the medical profession observations of great interest, involving matters of technical difficulty in more than one department of science. The work required for their confirmation must necessarily take many months. In the meantime, the wise (among whom we may include the lay press) will suspend judgment.

HEALTH AND EMPIRE.

THE Hastings Lecture delivered by Sir ANDREW BALFOUR in the Hall of the British Medical Association last Wednesday, a brief abstract of which will be found in our front pages to-day, is an eloquent plea for the development of medical research, with the development of the British Empire as the source of the information given and of the arguments set out. He paints a picture of a great battle between man and disease as witnessed in the various phases of the expansion of British rule. The story of tropical disease to-day is sufficiently tragic, but the ravages of endemic, epidemic, and incidental disease which occur within our borders in the twentieth century represent but a small fraction of the horrors which in the previous epochs decided the fates of armies and navies, and slew, or harassed to the point of death, the pioneers of colonial expansion. And when we speak of previous epochs it should be recalled that many of the diseases, now labelled tropical, until the middle of the nineteenth century flourished in our midst. Sir ANDREW BALFOUR reminded his hearers that as late as 1866 cholera was present in England and that three years later relapsing fever was claiming

victims in the poorer parts of London. As a matter of fact, at Somerset House deaths were registered from this cause over England for the next thirty years, though it is probable that there was here sometimes a confusion between relapsing fever and other forms of infantile fever. Malaria may be considered as absent now from the home shores, but the part played by ague in the country practitioner's responsibilities finds record up to mid-Victorian days.

Truly we have but just passed from the shadow of these diseases, and a pertinent lesson to be derived from the Hastings Lecture is that it was an apathy bred of ignorance which left us, in common with the rest of the world, so long their prey. Are we learning our lesson? Some two generations have now gone by since the establishment of compulsory education in this country, and with the disappearance of the illiterate it has become possible to diffuse general ideas of sanitation and general instructions for the preservation of health to a population who can follow the teaching. And during the last 15 years a remarkable impulse to the propagation of such teaching has been given by the experiences derived from the recent war. Those who expected that a newly educated public would at once become docile and receptive of wise teaching must have been sanguine, for the first result of popular education was the creation of a large class whose equipment just encouraged them to criticise what they did not understand, while it provided them with no opportunities and no incentives for pursuing their studies in such a way as to render their imperfect knowledge of greater use to the community, or of more solid comfort to themselves. That at any rate was the position which, until lately, the bulk of the population occupied in respect of medical science and medical endeavour. The nineteenth century may have been slow to organise the national fight against disease, but until recently the public conscience has not been roused by medical warnings. Now on all sides there are signs that the general public is awakening to the fact that in its own hands lies much of the power to prevent disease, to limit its spread, and to alleviate its miseries. The significance of their freedom from much of the sufferings of their parents and grandparents is perceived. At home we are reaching a stage when real coöperation between medicine and the public is taking place, but much time must elapse before such a state of affairs can be expected in many vast tracts of the Empire where tropical diseases are rife. What might be achieved by the education of the native in elementary hygiene was set forth persuasively by Prof. B. BLACKLOCK in a recent Chadwick public lecture. For the present reliance must be placed largely upon the efforts of experts, and for the training of these the London School of Hygiene and Tropical Medicine, whose activities Sir ANDREW BALFOUR directs, is the great new centre.

Research is the weapon which, wisely yielded, can open up for us paths in the jungle of ignorance, dispelling darkness and gloom and revealing vistas of hope and cheerfulness, health, and longevity. The Hastings Lecture demonstrated how good an ally to health the British Empire had been as a civilising and colonising power. With pride in our vast possessions, however, we must own to world responsibilities. We possess unique and often tragic opportunities of becoming intimately acquainted with tropical disease, and it becomes to us a national duty not only to alleviate and where possible remove the burdens of sickness in the interests of our own citizens, but to collect and sift the evidence by which the world may benefit.

THE REGISTRATION OF INDIAN MEDICAL DEGREES.

THE long and patient negotiations between the Government of India and the General Medical Council, in respect of the recognition by the Council of Indian medical degrees, have, at any rate for the time being, broken down. Since 1922 the Council has been striving to secure the registration of Indian graduates on a plan which will guarantee that their place is due to the possession of a professional training up to the standard required for practice in Great Britain and Ireland. The story, therefore, is a long one, but to detail its closing phases will be sufficient to make the situation clear.

At the meeting of the General Medical Council last November the President pointed out that the period for which the recognition of Indian medical degrees for registration in Great Britain and Ireland had been provisionally guaranteed was fast running out, while the appointment of a Government Commissioner of Medical Qualifications and Standards had not been made. The appointment of this officer was itself a provisional measure designed to furnish the Council with a responsible nominee, whose reports they could accept, until the promised institution of an All-India Medical Council came into material being. Apparently it was hoped by the Indian Government that the appointment of separate inspectors ad hoc would be accepted by the General Medical Council as a substitute for the Government Commissioner, but the reports of these inspectors which had been received were found to contain no reference to any common standards comparable with those which hold good in this country, while they disclosed individual deficiencies in regard to Indian methods of training and testing which could not be overlooked. To put it briefly, the position was that the General Medical Council, though furnished with these ad hoc reports, remained without evidence that the requisites, demanded by the Medical Act of 1886 before legal practice in Great Britain and Ireland can be undertaken, would be forthcoming. The Government of India, although informed of this, and repeatedly warned that the existing position could not continue, remained inactive. The appointment of a Government Commissioner of Medical Qualifications and Standards was not made, although the Council said plainly that registration for practice in this country of the medical graduates of certain Indian universities must otherwise cease early this year. Then, at the beginning of this year, a letter was received from the India Office saying that the appointment of the Commissioner was not possible, but stating that the Government of India proposed to proceed with the appointment of a Board to discharge the duties of the All-India Medical Council until that body came into existence. This Board, the India Office stated, would consist of the Director-General, I.M.S., and representatives of the medical faculties of the Indian Universities, and one of its duties would be to appoint certain inspectors as intermediaries between the Board and the General Medical Council. The Council, in the meantime, had received telegrams from the Viceroy stating that the appointment of the Commissioner was not possible, but putting forward a recommendation, received from a conference of the Indian Universities that, pending the creation of an All-India Medical Council, a Board consisting of representatives of the Government of India and the medical faculties of the Universities should be appointed as a temporary measure. A further telegram from the Viceroy indicated that this Board,

being established, would appoint inspectors, specialists severally in medicine, surgery, and midwifery, to report on the standards of Indian medical education and examinations, thus guaranteeing to the Medical Council that the possession of the medical degrees of a particular Indian University "ensured possession of the minimum qualifications accepted for registration in Great Britain."

This was the situation to be considered at a meeting of the Executive Committee of the General Medical Council on Feb. 24th, when it was felt that the perpetuation of temporary remedies for the main difficulty—namely, the possible registration of persons below the legal standard—was inadvisable. For not only had this country to be thought of, but all the overseas dominions. With these reciprocity is earnestly desired, but they will take no steps to such an end if doubts are raised about the standards demanded by the General Medical Council. It was accordingly resolved:—

(*a*) That, in the absence of authoritative information respecting the medical qualifications and standards of the Indian Universities of Bombay, Calcutta, Lucknow, Madras, and Punjab, the Executive Committee of the Council, in fulfilment of its duty under the Medical Act, 1886, Section 13, is unable for the time being to recognise the medical degrees of these Universities as "furnishing a sufficient guarantee of the possession of the requisite knowledge and skill for the efficient practice of medicine, surgery, and midwifery" in this country; and that accordingly the conditional recognition hitherto granted to these degrees has now lapsed.

(*b*) That the proposal by the Government of India to appoint a temporary Board, contained in the letter from the India Office of Jan. 11th, 1930, has been carefully considered by the Executive Committee; but it is unable to accept the proposal as furnishing a satisfactory method of supplying the Council with authoritative information on medical qualifications and standards in India, and with the necessary guarantees of sufficiency.

A third resolution dealt in similar *non possumus* way with the situation at the Universities of Rangoon and Patna, whose degrees have never been recognised. All who have followed the various negotiations step by step will be prepared for the Council's decision. The Council has displayed patience and tact in the prolonged discussions, has taken evidence upon the spot before forming its conclusions, and has formed them only when the lapse of time made action necessary. Upon an important section of Indian students the veto against registration in this country will bear hardly, and especially will their teachers and the authorities of the Indian Universities be unwilling to admit that further delay could not be granted. But those who realise the necessity of keeping medical practice in this country up to an adequate level of efficiency will see that the course taken by the Council is right.

THE Red Cross Clinic for Rheumatism will be available for treatment on Monday next, and applications for appointments may now be made either by letter addressed to the Medical Superintendent, Peto-place, Marylebone-road, London, N.W.1, or telephone Museum 9441. Representatives of approved and friendly societies, trade-unions, and others interested in the treatment of rheumatism are invited to visit the Clinic and inspect the building and its equipment.

REST ROOMS AT ST. BARTHOLOMEW'S HOSPITAL.—Rest rooms for relatives and friends of patients in St. Bartholomew's Hospital are being provided, at a cost of £15,000, by the butchers of Smithfield. The rooms, which include lounges, a canteen and cubicles, are now approaching completion and are expected to be ready for use a few weeks hence. The money is to be provided by the deduction of 10 per cent. from the total subscriptions to the Derby sweepstake of the Smithfield Mutual Benevolent Fund.

Annotations.

"Ne quid nimis."

CHILD PSYCHOLOGY.

WHAT is it that has led in recent years to the sudden and passionate interest in the child's mind, to a curiosity in discovering not only the lines of its normal development, but the reasons for its strange divergences? Perhaps we are at the end of an epoch in which all our growing mechanical devices are leading us away from the world of nature into one of mechanism, against which however life itself is still strong enough to put up a fight against all processes making for petrifaction. It is not surprising therefore that we should be endeavouring to safeguard the tender plant, the child, while still green and pliable and capable of taking such shape as we think best for its own happiness and for the good of the community. The study of the child has been to many the ground of normal psychology; to others it has been a study for its own sake; to many modern students the study of the child for its own sake is a prelude to understanding the disorders of the child mind which make even for physical disability as well as for anomalies of behaviour. Understanding of these disorders, as Freud and his school have shown us, is a prelude to understanding the disorders of the adult mind. There has been so much written on abnormal psychology of the child in the light of psycho-analysis that students may forget, even if they have at one time been aware of, the contribution made to this subject by those who have made researches in the normal field. We have to be thankful particularly to two pioneers in human psychic origins as manifest in the study of the child mind, Jean Piaget and K. Koffka. In a revised edition[1] Prof. Koffka has given us an acute analysis of the mind of the child from a unique angle, an angle which has illuminated academic psychology as it has not been illuminated for more than a quarter of a century. The study of mental processes as configurations (*Gestalten*) has to many freed psychology from an atomism which enslaved it for many years. It is a psychology which has to recommend it a conformity with the recent researches of Lashly and, more remotely, with Head's conception of aphasia. In Prof. Piaget, whose works continue to be translated and are accessible to all, we witness the production of a new method by questionaire for throwing a light on the mental processes of young children in order to determine the way in which their world is built, the form and function of its conception of the external wold. In his recent volume[2] Piaget gives us the fascinating immediate material for understanding the strange animism and idea of participation which underlies the realism of the child. He analyses the child's attitude towards the objects and forces of nature, and to those who can view his discoveries in the light of the dynamic psychology of Freud, a new vista will be opened up into the recesses of the child's mind. For those who have once entered this Aladdin's cave of child wonder and have studied the transformation from infancy to adolescence, there will be no going back. To guide the new Child Guidance Movement these volumes will be invaluable. The same may be said of a study by Dr. James Drever and Dr. Margaret Drummond.[3] Here, too, we have an analysis of the child mind from the periods of pure instinctual movement and satisfaction to the nursery school. It is, in many ways, a practical expression of the foregoing works, although it does not actually deal with either the methods or problems of Koffka and Piaget.

[1] Growth of the Mind. Second edition, revised. London: Kegan Paul, 1929. Pp. 388. 15*s*.

[2] The Child's Conception of the World. London: Same publisher. 1929. Pp. 397. 12*s*. 6*d*.

[3] Psychology of the Pre-School Child. London: Partridge. 1929. Pp. 222. 6*s*.

PULMONARY TUBERCLE OF BOVINE TYPE.

THE occurrence of the bovine tubercle bacillus in pulmonary infection has hitherto been considered a rare curiosity of little practical significance. For example, Park and Krumweide, in the United States, only record two instances of undoubted bovine infection in 680 cases of pulmonary tuberculosis, whilst A. S. Griffith, in this country, has found three instances in 212 cases. But Dr. W. T. Munro, of the Fife and Kinross Sanatorium, Glenlomond, has re-examined the matter in the light of a large series of experiments on sputum and pus from cases occurring at the sanatorium, using as his standard of identification of the bovine type its dysgonic growth in culture and its low virulence on intravenous inoculation in rabbits. Details of the viruses are given in a paper which appears in a special Tuberculosis Number of the *Edinburgh Medical Journal* (March, 1930, p. 141). Two years ago in our own columns [1] Dr. Munro gave an account of five cases from whose sputum tubercle bacilli of bovine type had been grown in culture. He has now double this number, ten of bovine type out of 250 cases. In four of these the disease had spread from the root of the lung, five showed the distribution common in pulmonary tuberculosis of human type, and one stood alone with multiple abscesses. Setting this case aside, Dr. Munro notes as the most striking features of the series (1) the amount of fibrotic change, (2) the lack of evidence of much breaking-down of lung tissue, and (3) the absence of hæmoptysis. Although he does not wish to overstress these points he does suggest that there is more chance of bovine tubercle patients overcoming their systemic disturbance than would be the case with a similar group of infection with human type. Dr. Munro then asks certain pertinent questions and endeavours himself to supply answers to them. Why, for instance, are bovine-type tubercle bacilli so rarely found in the sputum of patients suffering from pulmonary tuberculosis? The bovine bacillus being dysgonic it is, of course, more likely to escape attention by those bacteriologists who cultivate and investigate the tubercle bacillus in sputum, and, according to Dr. Munro, it is just when tubercle bacilli are scanty that there is most chance of their being bovine. He is inclined to think that his higher percentage of positive bovine is due to the fact that he has made cultures from every sputum in which tubercle bacilli were present, whether numerous or scanty. Again, he asks, is the bovine virus less capable of generalisation in the human subject than the human virus? Dr. Munro quotes evidence to show that there is a larger percentage of recoveries in bovine-type infections, and he believes it to be a reasonable argument to advance that the bovine type is not so capable of general lymphatic spread in the human subject as is the human type. Referring to Marfan's law of the rarity of pulmonary tuberculosis in persons who during childhood have had suppurative adenitis of the neck, Dr. Munro states that in cases where he has had the opportunity of examining material from both cervical gland and sputum in the same patient he has always obtained the human-type bacillus. Furthermore, tubercle bacilli from kidney lesions are in the experience of most workers almost always of the human type. Going on to consider Aschoff's division of pulmonary tuberculosis into two types, exudative and proliferative, Dr. Munro suggests that the allergic response to the bovine bacillus is more likely to be of the proliferative than of the exudative type, and thinks that when tubercle bacilli are found at the beginning of the illness with a bovine infection they are likely soon to disappear because of this proliferative response. This benign bovine infection may lead to protection against superinfection by the bovine type, while it is apt to break down when confronted with the human type of bacillus. Finally, he asks, is it possible that the bovine disease has been contracted by aerogenous infection? In none of the cases was there any family history of tuberculosis, and in only two was there any account of contact with cattle on farms in earlier years. Dr. Munro remarks: "But when one stops to think of these ten cases of pulmonary tuberculosis due to bovine-type tubercle bacilli, one must accept that it is most unlikely that superinfection was air-borne. And if these cases are not air-borne, is chronic pulmonary tuberculosis ever air-borne?" Subcutaneous inoculation on animals has satisfied him that, contrary to the usual experience, it was possible to produce chronic pulmonary tuberculosis with cavity formation. Experimentally, then, it is not essential for the tubercle bacillus to be air-borne in order to produce chronic disease of the lung.

[1] THE LANCET, 1928, i., 384.

THE ÆTIOLOGY OF PSORIASIS.

DETERMINED efforts to ascertain the cause of psoriasis have been made. Two main theories are held, the metabolic and the parasitic, the former of which includes the endocrine and neuropathic. A great deal of research, with which the name of Prof. Schamberg of Philadelphia is particularly associated, has been expended on the biochemical side of the problem, but no positive conclusions have been reached. A group of American dermatologists have recently published [1] the results of exhaustive mycological studies concerned with the relatively common occurrence of monilia, a yeast-like fungus of increasing importance in dermatology, in the psoriatic lesions, the fæces, and the blood of patients affected with the disease. The authors make no extravagant claims, but their work has obviously been most carefully done, and nothing has been omitted or over-emphasised with a view to converting readers to the importance of the findings. It was first ascertained that in 100 stools of persons without psoriasis the monilia in question could be recovered in six. In patients with gastro-intestinal disturbance the percentage rose to 40. Normal persons do not harbour the organism on the skin of the elbow (26 cases examined), nor is it a common superinfection in conditions such as eczema, although Castellani and others have isolated it from various lesions, mostly of intertriginous type, in the groins, perineum, and interdigital spaces.

Wachowiak and Fleisher have demonstrated moniiia organisms in the blood of certain cases of sprue and other intestinal infections. They state that its significance is not entirely clear, but in view of the fact that ringworm organisms are occasionally present in the circulation in cases of kerion type of tinea, the possibility of a direct connexion between the organism and the disease deserves consideration. Their investigations in cases of psoriasis show that in the first series of 24 persons monilia was found in the fæces in 20, in the blood in 5, and in the skin scrapings in 11. In their second group of 32 patients the organism was isolated from the fæces of 30, from the blood of 3, and from the skin of 9. Skin susceptibility tests with the organism were carried out with due controls and independently by Prof. Strickler, whose results certainly support a specific allergy in affected persons. In 40 cases 31 showed a "strongly positive reaction," and in all the other 9 there was "an evident reaction." Animal tests and attempts to reproduce the disease both in them and in man were unsuccessful. It is clear that Koch's postulates are not fulfilled, and the causal relationship of monilia and psoriasis is certainly not proved, but the connexion is sufficiently striking to warrant further investigation. Another method of study was attempted with only partial success. Cultures of monilia were sterilised and injected into a psoriasis patient in appropriate vaccinal doses. A few cases cleared up for a time, but the majority either showed no result or relapsed, in just the same way as these patients are

[1] American Archives of Dermat. and Syph., 1929, xix., 713.

apt to do after any protein injection. The authors themselves have little doubt that monilia is in some way related to psoriasis. They remind us that it is the undoubted cause of thrush, and has been claimed as the cause of sprue, some cases of bronchitis and pneumonia, and erosio interdigitalis and epidermycosis. That this organism can function as a pathological agent in the production of diseases is not disputed; but here, as elsewhere, the presence of monilia may be only of secondary significance. Medicine teems with examples of such symbiotic relationships. It is generally acknowledged that many of the symptoms of pulmonary tuberculosis are due to streptococci and staphylococci, and that the majority of fatal cases of malignant disease eventually die of sepsis. It is possible that the relatively poor reactive powers, which it is safe to assume for the psoriatic lesion itself, is the probable cause of the relative abundance of monilia organisms to be found there, and also the indirect cause of the invasion of the blood stream by the organism and of its excretion in the fæces.

It is surprising that in setting out their conclusions the authors have not discussed the possibility of such a mechanism. Their paper, however, is worthy of consideration as a serious contribution to dermatological research.

THE DRAFT POOR LAW ORDER.

A FEW years ago the Minister of Health found it impossible to proceed with the reform of the poor-law until the relevant existing statutes had been written out in intelligible form. The result was the consolidating Poor Law Act of 1927 which, though it preserved many provisions which were about to undergo drastic reform, offered the reformer a reasonable chance of reconnoitring the ground he was to attack. Something of the same sort seems to be happening to the Minister's poor-law Orders. The tangle of the present Orders has still some strands of a code issued as long ago as 1847. The Minister has produced a new draft Poor Law Order in nine parts, re-writing the previous provisions under such heads as Institutions, Hospitals, Children's Homes, Boarding-out of Children, Apprenticeship, Casual Poor, and Officers and Servants. His draft is expressly stated to be a consolidation of the existing orders with adaptations consequent upon the passing of the Local Government Act of last year. This means that, as that Act abolishes boards of guardians and substitutes the councils of counties and county boroughs, the nomenclature of the poor-law orders is in this and other respects brought up to date in the light of the table of equivalents contained in Schedule 10 of the Act. Other changes have, of course, to be made. References to the overseers disappear because those officials were abolished by the Rating Act of 1925; and the central authority which in 1847 was set up as the Poor Law Board and which in 1871 became the Local Government Board, now the Ministry of Health, must naturally be referred to by its modern title. On the other hand poor relief has not yet been replaced by the new label "public assistance."

The draft Poor Law Order, therefore, it seems, is a mere modernisation of outstanding provisions, a necessary preliminary to any fresh developments. The draftsman appears to have done his work neatly and concisely. The three-page "Paupers Conveyance (Expenses) Order" of 1898, for example, seems to have been reduced to seven lines in Article 19 of the draft, while the 17 pages of the "Boarding-out Order" of 1911 seem to be contained within the four pages of Part VI. of the draft. There is only one complaint to make. Article 7 of the new code says airily that all rules, Orders, and regulations, whether general or special, heretofore made by the Minister under the law in force from time to time relating to the relief of the poor, so far as not already rescinded, are hereby rescinded (except certain sets of orders and regulations which are expressly saved). This is a slovenly method of legislation, unfair to the public and exasperating to anyone who honestly tries to find out the law. The draftsman knows perfectly well which Orders he is superseding and reproducing in his new document. Why does he not set them out in a list and remove uncertainty by definitely revoking each one?

The draft Order, it will have been understood, seems to involve no change in the law. No medical officer of health or medical practitioner will find himself any the worse. Everyone, in fact, must welcome the clearer and more concise statement on a subject which is so rapidly changing. Already the consolidating Poor Law Act of 1927 is to be replaced by a fresh consolidating Act which has passed through Parliament. It remains nothing less than a scandal that the same process is not applied to the general law of public health and local government based on statutes passed half a century ago. The law is uncertain as well as out of date. Anyone who tries to search out the powers of county borough councils, for instance, has a dismal task ahead of him. It is not well that a department should be the only repository of knowledge in these matters. Let the Ministry of Health carry the process of consolidation further.

ŒSOPHAGEAL OBSTRUCTION IN CHILDREN.

AN anatomical or physiological defect of the œsophagus, serious as it is at all ages, is doubly so in childhood, when it threatens the efficient performance of the functions needed for growth and development, as well as for maintenance of bodily health. Except in such conditions as atresia and congenital stricture, it has long been recognised that there is a possibility of recovery under prolonged and careful treatment, but there has been considerable divergence of opinion on the mode of treatment yielding the best results. It seems likely that the conflicting evidence on this point has been to some extent due to an imperfect classification of the defects encountered, and that a clearer conception of the pathology of these cases will divide them into diverse types, for each of which a different therapeutic technique is indicated.

The work which has been done by J. A. M. Cameron, G. W. Raike, and others has shown that the condition of cardiospasm, or achalasia, is a definite clinical entity dependent on a defect of neuromuscular mechanism, associated with degeneration of Auerbach's plexus in the lower end of the œsophagus. Good results have been obtained in this disorder by the passage of mercury bougies, continued over a long period, as described by A. F. Hurst.[1] The treatment of œsophageal obstruction has, however, been decidedly less satisfactory in small children than in older ones and in adults. A valuable communication by Dr. Wilfrid Sheldon and Dr. A. G. Ogilvie [2] strongly suggests that this may be due to the fact that the obstruction in children is usually occasioned by some factor other than achalasia. These authors have made a careful study of six children observed by them at the Hospital for Sick Children, Great Ormond-street, and of the records of six cases previously treated there. Of these 12 cases, two only showed obstruction at the level of the diaphragm, and they appeared to be cases of congenital stricture. In the remaining ten the obstruction was at the level of the seventh thoracic vertebra, and they appear to form a clinical group with well-defined characteristics. In all the severe cases the vomiting dated from birth or the first few weeks of life; it usually became more severe when solid food was added to the diet. It was possible to observe some of these children at intervals during a number of years, and to compare the radiographic appearances at different ages. The authors are of the opinion that these children did not obtain real benefit from the passage of bougies. In the case-histories of some of them immediate improvement is recorded as following this measure, but it was

[1] THE LANCET, 1927, i., 618.
[2] Arch. Dis. Child., 1929, iv., 347.

usually followed by re-admission with recurrence of the symptoms, sometimes in an aggravated form; in no case was a lasting benefit or a cure obtained. The cases in which the greatest improvement—sometimes amounting to cure—was obtained were those which were treated by prolonged restriction to a fluid diet, without the passage of bougies. Only two of these came to autopsy; in one of them the symptoms had been cured at the age of 3½, and death from tuberculosis occurred later, the œsophagus being found to be absolutely normal.

Sheldon and Ogilvie make some interesting suggestions on the pathology of this type of œsophageal obstruction. They believe that the abnormality is congenital. This conception is supported by a high incidence in premature children and a four-to-one ratio of males to females, as well as by the onset of the symptoms in early infancy. They suggest that a narrowing may take place at the junction of the two segments (retropharyngeal and pre-gastric) of the foregut by the union of which the œsophagus is developed, or that the lower segment may be narrowed as the result of inadequate growth. If suitable conditions can be maintained—the most important being a purely fluid diet—spontaneous cure of the symptoms may be achieved by the growth of the œsophagus to a calibre adequate for the transmission of solids. They have certainly made out a case for regarding the majority of œsophageal defects in children as something different from achalasia, and for giving prolonged trial to this method of treatment.

LIVER IN ANÆMIA.

WITHIN the last four years a great deal has been added to our knowledge of the use of liver in the treatment of anæmia, and Dr. Janet Vaughan[1] finds a general consensus of opinion that it is a certain remedy for those forms associated with a megaloblastic hyperplasia of the bone-marrow. The best known of these is, of course, "pernicious" anæmia, but a good deal of evidence has now accumulated tending to bring under this heading the anæmia of sprue and also the type described by Channing, in the 'forties of last century, as the "grave anæmia of pregnancy." It has still to be directly proved whether there is megaloblastic hyperplasia of the bone-marrow in this last type of anæmia, but the condition is characteristically associated with a high colour-index, and this is indirect evidence of such hyperplasia. In all these states there are signs that the therapeutic action of liver is seriously inhibited by sepsis, but this is not to be taken as an indication that sepsis is in any way their cause. It is further generally agreed, says Dr. Vaughan, that liver is useful in the treatment of anæmia secondary to gastric and other hæmorrhage, and that in these conditions its action is enhanced by simultaneous administration of iron. It is also of value in certain of the nutritional anæmias. Whether the principle effective in anæmia of the megaloblastic type is the same as in the others remains uncertain. There is little doubt that in the megaloblastic forms the effective principle is the polypeptide isolated by E. J. Cohn; in the secondary anæmias the inorganic salt content of the liver may be of importance, and this may explain the observation that liver extracts are useless in certain types of anæmia, particularly those with a nutritional basis, which respond well to whole liver. On the evidence to date Dr. Vaughan comes to the conclusion that pernicious anæmia must be regarded as a deficiency disease, having as its basis the absence of some principle normally present in both liver and kidney, without which the bone-marrow cannot produce or liberate its normal quota of red cells. As to the mode of action of the liver, two different views are held. J. Müller believes that pernicious anæmia is due to over-action of the reticulo-endothelial system, resulting in the production of megalocytes at the expense of normal red cells; he thinks that liver acts by inhibiting the megalocytic hyperplasia and giving an opportunity for formation of normal red cells. G. R. Minot believes that the primary deficiency is failure of the red cells to attain maturity and that liver acts by stimulating the cells to complete their growth cycle. His view gains much support from embryology, and bids fair to be established. But even so, the nature of the force causing this abnormality in the growth of the red cells remains obscure.

[1] Quart. Jour. Med., January, 1930, p. 213.

CLINICAL EFFECTS OF OVARIAN HORMONE.

IN a preliminary communication to the Royal Society of Medicine (Section of Therapeutics and Pharmacology), on Tuesday last, Prof. E. C. Dodds and Dr. J. D. Robertson put the landmark in the history of ovarian hormone research at the time when Allen and Doisy first standardised the material by the vaginal smear method. Characteristic cells appear in the smear during the three stages in the cyclical changes, and Allen and Doisy showed that the injection of extracts made with the use of volatile solvents would cause these changes to reappear. As there is a definite quantitative relationship between the amount of hormone injected and the changes in the vaginal smear the biochemist is now able to estimate the strength of his preparations. This has enabled him to proceed with the purification of the material so that whereas in former years the preparations were in the form of a stiff oil, insoluble in water and with a rat-unit of only 10–15 mg., nowadays it is possible to obtain a water-soluble material containing several hundred rat-units to the milligramme. In this form it can be injected into human beings without causing any of the severe local and general reactions that it produced in the past. When injected subcutaneously œstrin has been known to produce: (1) œstrus in ovariectomised animals, (2) premature puberty in young immature female animals, and (3) abortion of pregnant animals. It does not follow, however, that it will therefore cause menstruation and abortion in women, and it is not fair to expect it to induce processes in human beings which possibly bear only a distant biological relationship to those occurring in the lower animals.

The preparation employed in the clinical experiments related by Prof. Dodds and Dr. Robertson was made by the process already published from the Courtauld Institute of Biochemistry and contained 10 rat-units per c.cm. Since the investigators were quite in the dark on the dosage all the patients received 1 c.cm. per day for two months. It was thought that the best results would be obtained by giving a series of small doses over a considerable period, as it had been shown in animal studies that a better response was evoked by small doses spread over a period of days than by one large dose. The patients injected were cases of amenorrhœa in both married and unmarried women, patients from whom both ovaries had been removed, and attempts at the induction of labour. The following table summarises the results, cases which could not take the full two months' course having not been further analysed.

	Unmarried.	Married.
Cases treated	40	38
,, having full 2 months course ..	32	30
,, in whom menstruation started	10	18
,, feeling better	30	29

In the successful cases slight bleeding usually occurred within a week or ten days of the treatment, sometimes amounting to a full period, and this was followed in three or four weeks' time by a perfectly normal period. After two months' treatment the periods continued to appear regularly and the patients all felt much better. This improvement in health, however, as also in the cases when menstruation did not occur, was partly due to psychological causes as excellent tonic effects were observed in many cases receiving normal saline injections who thought they were getting the active preparation. In three

attempts at producing premature labour only one was definitely effected and the experiments were abandoned. Five cases of menopause were treated with definite improvement in all.

It will be seen from the summary that only 30 out of nearly 80 cases treated showed objective improvement, and the investigators expressly stated their feeling that the series was too small to form the basis of a valid opinion, and that at least 1000 cases of amenorrhœa should be treated before the material could fairly be assessed. Much larger doses must be given, they thought, particularly in the attempts at producing premature labour, before discarding the substance as useless, but this was impossible at present owing to the expense and labour involved in producing the material. They concluded by pleading for a thorough trial with objective results.

NEW METHODS IN SPINAL ANALGESIA.

Two papers at the Section of Anæsthetics of the Royal Society of Medicine last Friday produced some sound evidence of the value of spinal injections in the present state of knowledge. The first by Mr. Charles Donald gave a judicious and well-balanced account of the value of spinocain, the merits of which have been, as is so often the case with a new method, suffering from over-statement. Mr. Donald showed that in most respects spinocain is neither better nor worse than novocain. It has the advantage of being more slowly absorbed and therefore less toxic, but the extravagant claims made for it as regards exact localisation of analgesic effect and as regards absence of fall of blood pressure, or of subsequent ileus, were shown to be unfounded. In the other paper Dr. Howard Jones trod new ground with the use of large quantities of percain in dilute solution as an intrathecal injection. He stated that his account must only be regarded as a preliminary, but the results he detailed were excellent, and were borne out by the testimony of other speakers. Dr. Howard Jones's method is based on principles determined by the specific gravities of the cerebro-spinal fluid and of the injected liquid, and provide a logical means of affecting the anterior and posterior roots in accordance with the decubitus of the patient, and of localising the upward extension of the analgesia with sufficient accuracy for practical purposes. In upper abdominal work he cannot eliminate vagal effects when the stomach is handled (e.g., retching), but he can produce at will a perfect block of spinal nerve roots up to the second dorsal vertebra. The value of percain lies largely in the extreme dilution in which it is effective and the consequent absence of toxic effects from absorption into the general circulation. The condition of patients with percain is superior to that usual with novocain or stovaine. The after-headache does occur, but this and after-vomiting are certainly not more severe than those not uncommonly met with after the use of the former drugs and may be even less severe.

CONGRESS OF DERMATOLOGY AT COPENHAGEN.

THE eighth International Congress of Dermatology and Syphilology is to be held in the Christiansborg Palace at Copenhagen from Monday, August 4th, to Saturday, August 9th, under the patronage of the King of Denmark and the presidency of Prof. C. Rasch. After a meeting of delegates on Monday afternoon and a reception in the evening, the Congress will be opened by the King at 9 A.M. on Tuesday, to be followed by a discussion on the Ætiology and Pathogenesis of Eczema, introduced by Darier (Paris) and Jadassohn (Breslau). On Wednesday morning the subject of Syphilis: Immunity, Reinfection, Superinfection, will be introduced by Truffi (Padua) and Wade Brown (New York). On Thursday morning dermatological cases will be demonstrated at the Rigshospitalet, and on Friday morning a discussion on Tuberculosis of the Skin and its Treatment will be introduced by Adamson (London) and Reyn (Copenhagen). Every afternoon except Thursday individual papers will be read and discussed; intending readers are asked to communicate before April 1st with the Secretary-General of the Congress, Dr. Svend Lomholt, Raadhuspladsen 45, Copenhagen, and to state if any projection apparatus is desired. A maximum of 15 minutes will be allowed for the reading of these papers, of which a short summary in English, French, German or Italian should be sent to the Secretary before June 15th. Foreign members wishing to take part in the Thursday demonstration of cases should apply to Dr. H. Haxthausen, Finsens med. Lysinstitut, before June 30th; accommodation for such patients will be provided gratis for two days in the skin department of the Rigshospitalet. A scientific exhibition will be held during the whole period of the Congress from 9 A.M. to 6 P.M. in the Kongens Ridehus at the Palace, the manager being Mr. C. B. Ingwersen, Danasvej 30, Copenhagen V., to whom applications for participation should be addressed. The Dansk Rejsebureau has undertaken to make arrangements for the accommodation of members of the Congress at very moderate figures and there will be a travel bureau enabling visitors to make tours in Copenhagen and excursions to Bornholm, Jutland, and Odense. The Danish State Railway is offering members of the Congress a reduction of 50 per cent. on their return tickets. The British delegates to the Congress are Dr. H. G. Adamson and Dr. Arthur Whitfield, Dr. A. M. H. Gray being local secretary.

THE ACTS OF RAHERE.

ON March 11th a cast of actors, whose names are not announced, gave the first performance of the "Acts of Rahere," a play depicting the foundation of St. Bartholomew's Church and Hospital 800 years ago. Rahere was one of those "fiery particles" which have a lasting hold on the imagination. He was officially the Court jester of Henry I., and attained much influence while still a young man. After religious conversion he went on pilgrimage to Rome, and there during illness had a vision of St. Bartholomew, who told him to build a church and hospital in the Smooth Field, one of the most depressing and useless spots in the neighbourhood of London, a deserted swamp near the public execution ground. He promptly returned to England, discovered that the site he wanted was the King's and boldly asked for it, in spite of Henry's anger at his desertion. He not only gained his point but his Sovereign's interest and practical help, and he soon drew support in money and personal service from a large section of the population of London. This is the drama that the actors of St. Bartholomew's reconstruct every evening at 6 o'clock in aid of the project to build a new surgical wing holding 250 beds and an operation block with six theatres. The stage is the sanctuary of the old church itself beside Rahere's own tomb; the performance, in the candle-lit setting of this perfect Norman fabric, is extremely impressive.

Dr. Norman Scott Carmichael, Physician to the Royal Hospital for Sick Children, Edinburgh, has been appointed Surgeon Apothecary to the King's household at the Palace of Holyroodhouse.

THE William Mackenzie Medal for 1929 for original contributions to ophthalmology of outstanding merit has been awarded by the custodians, The Glasgow Eye Infirmary, to Prof. J. van der Hoeve, of Leiden, Holland.

Dr. Carey F. Coombs will deliver the Lumleian Lectures at the Royal College of Physicians of London at 5 P.M. on March 20th, 25th, and 27th. His subject will be Syphilis of the Heart and Great Vessels, and members of the medical profession will be admitted on presentation of their cards.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CCC.—THE TREATMENT OF HÆMOPTYSIS.

The Causes of Hæmoptysis.

NEARLY every student when asked the causes of hæmoptysis begins by describing "false hæmoptysis," coming from the teeth, the throat, and the larynx. A modicum of intelligence on the part of the patient and the doctor is sufficient as a rule to determine whether the blood is coughed up or not. If it is in streaks mixed with phlegm it must almost certainly have come from the lung; if it is in larger amounts it must come from the lung. The differential diagnosis between hæmatemesis and hæmoptysis is, of course, important, but not usually difficult, and for reasons of space will not here be discussed. Disastrous errors occur because hæmoptysis is ignored or its cause belittled. Hæmoptysis implies some pathological condition needing investigation. The commonest cause, apart from acute infections such as the pneumonias, is pulmonary tuberculosis. The diagnosis of this depends on symptoms, on bacteriological examination of the sputum and fæces, the temperature record, weight record, physical and X ray examinations. Frequently after a hæmoptysis the doctor, finding no abnormal physical signs in the chest, sends the patient to a laryngologist instead of making further investigations into the state of the lungs. There is practically no condition in the larynx which will produce a hæmoptysis of any appreciable amount. The following example is a not uncommon type of tuberculous hæmoptysis. Yet, in my experience, incredible as it may seem, the hæmorrhage would have been explained by many medical men in some other way; a true diagnosis might never have been made, and the subsequent course would have lent support to whatever false hypothesis had been formulated.

One evening a medical student coughed up over half a pint of blood. He was taking his finals and had appeared to be in normal health. His temperature after the hæmorrhage was slightly raised. His appearance was anxious. There were abnormal signs in the left upper lobe. Some of the clotted blood was taken for examination. Tubercle bacilli were found. In three weeks his temperature was normal, he was putting on weight, the abnormal physical signs had entirely disappeared. The X ray picture, taken within six weeks of the hæmoptysis, was absolutely normal, and repeated examinations of the sputum did not reveal tubercle bacilli again. He went to a sanatorium for a time, returned, became qualified, and has for some years now remained in robust health.

If it were not for the first bacteriological examination in this case the proof positive would have been lacking. Nevertheless, whether tubercle bacilli are found or not these hæmorrhages are almost always of tuberculous origin, except when they are due to something much worse and much rarer—namely, bronchiectasis or malignant growth.

After tuberculosis we come to rarer causes. Other chronic infections must be considered — non-tuberculous fibrosis, bronchiectasis, and such rare conditions as actinomycosis and broncho-pulmonary spirochætosis or spirillosis. There is a type of bronchiectasis, the chief symptom of which is not expectoration but recurrent hæmoptysis, sometimes profuse. Without a lipiodol injection exact and positive diagnosis is impossible. After bronchiectasis come neoplasm, infarct of the lung, and abscess of the lung. Infarction is especially common with mitral stenosis, but may occur with phlebitis of any systemic vein, particularly of the femoral vein. Infarction of the lung may occur before any pain or œdema is obvious in the leg. Hæmoptysis is also possible in intense congestion from back pressure, and possibly from local thrombosis in the lung itself. Other causes are aneurysm, foreign body, certain parasites, such as distoma, &c. Injury, of course, may cause hæmoptysis; not only the obvious bullet wounds, sword thrusts, and bayonet stabs of the text-books, but severe blows and an unrecognised fracture of the ribs and clavicle. High blood pressure may be the cause of hæmoptysis. It may occur in certain blood disorders—purpura, hæmophilia, scurvy, leukæmia. Occasionally one meets with a brisk hæmoptysis in elderly people; after full investigation, and having excluded tuberculosis, new growth, and high blood pressure, all that one can say is that there appears to be an old scarred area. The origin of this may have been an antecedent tuberculous or non-tuberculous infection at some time.

Measures for Relief.

In some cases treatment of the cause may stop the hæmorrhage. For example, the relief of congestive heart failure by venesection, cupping, heart "tonics," and so on, or the proper treatment of scurvy. But these are infrequent causes of hæmoptysis. Unfortunately, we do not know how to prevent infarction, but fruit juice and citrates are worth trying. Hæmoptysis in high blood pressure cases may be severe and cause much distress and anxiety, and be very difficult to control. Venesection may be called for, and here, if anywhere, the vasodilators would seem theoretically to be indicated; the nitrites, trinitrin, erythrol tetranitrate, amyl nitrite, &c., hot mustard foot baths, and such remedies as ipecacuanha and emetine are worth trying. The coagulants to be mentioned later are, of course, theoretically contra-indicated, for fear of producing thrombosis in other parts to which the patient is already predisposed. The largest hæmorrhages come from tuberculous and bronchiectatic cavities, occasionally from growths and from rupture of an aortic aneurysm. For the last mentioned very little can be done beyond rest and the giving of some form of opium to allay restlessness. It is chiefly the hæmorrhages from tuberculosis or bronchiectasis that we shall be called upon to treat. The number of remedies is legion. Bleeding tends to cease spontaneously. For this reason many remedies have gained an undeserved reputation.

A sudden hæmorrhage may occur without any warning. The patient is terrified. The first thing, therefore, is to try to allay anxiety by giving a small injection of morphia, just enough to calm the patient but not sufficient to suppress in the least the cough reflex. If care be not taken in this respect there is a great danger of blood being aspirated into other bronchi and flooding the whole lung with blood, thus setting up a pneumonic condition. Some give codeine, gr. 1/7th (though why 1/7th, except to confuse the student, I do not know), two or three times in the day, instead of morphine. The patient must be so arranged that he can get rid of the blood from his mouth with the least possible exertion. An ice pack on the chest is comforting for the patient, and the relations, and if it does no good it does no harm. The position should be a comfortable one. Let there be no hard-and-fast rule. A semi-sitting posture may be the best. Rigid insistence on absolute rest in the flat position is absurd.

If the bleeding continues one or more of the following remedies may be employed. The action of none of them can be guaranteed, but no apology is made for the length of the list because we must do something, and from the urge within us to do this something, and for the sake of the patient, and the relatives, it is of great help to have several remedies at our disposal. An old simple device and one that may be effective is half a teaspoonful of common *salt* in water, given by mouth. Salt may also be given intravenously, 5 c.cm. of a 10 per cent. solution. Gravesen recommends *calcium chloride* 20 c.cm. of a 15 per cent. solution, given intravenously slowly and with great care not to get it into the tissues as it is corrosive. An injection of *hæmoplastin* may be given. The objection to this, however, is the possibility of an irritating rash or serum sickness. This, when it

occurs, may be controlled by adrenalin, but adrenalin given hypodermically has been condemned in hæmoptysis. *Coagulen-ciba*, 5 c.cm. may be given hypodermically. This is said to contain bovine blood-platelets and not to cause serum reactions. A. J. Morland, however, reports a case where the patient, after an injection, experienced a sensation of lumps all over his body and these would appear to have been of an urticarial nature. This same author has injected coagulen-ciba 5 c.cm. and 10 c.cm. directly into a cavity in a case of severe, recurrent, and dangerous hæmorrhage, apparently with dramatic effect, and this is well worth trying in serious cases where there is a large cavity in a known position, or even as a hazard, if things are desperate. Two other substances which claim to increase the coagulability of the blood may be mentioned: *thromboplastin* and *fibrogen*. They must be used subcutaneously or by mouth, or both, but not intravenously. *Ergot* has been extolled by certain optimistic clinicians, but on pharmacological grounds should do more harm than good. *Emetine* in gr. ¾ doses, given hypodermically three or four times in a day, is worth trying. *Amyl-nitrite* inhaled is both extolled and condemned. It has the support of many clinicians. The same applies to *nitroglycerin* in 2 to 4 minim doses. *Oil of turpentine*, minims 20, in an emulsion every four hours, is a time-honoured remedy which does no harm. *Adrenalin* cannot be justified on experimental grounds. Given intratracheally, however, by the oral route, over the back of the tongue, as one gives an oral lipiodol injection, it is said to be most effective. This is perhaps true, but the obvious objection is the impossibility of doing it in an emergency when blood is welling up into the mouth. In a calm interval, however, it might be worth trying. *Binding the limbs*, but not for too long a period, may tide the patient over a critical period. Even *blood transfusion* may have to be considered.

Artificial Pneumothorax.

If none of these things acts, and matters are becoming urgent, there is only one method that is likely to be effective and that is the production of an artificial pneumothorax. In hospital where the apparatus is available it should not be used only as a desperate resort. If it were known from which side the blood was coming it would be used early, but it is not always possible to determine this. Even so, it would be better to induce a partial bilateral pneumothorax than to do nothing. The time is long overdue when every practitioner of medicine should know the inestimable value of such induction. If the affected lung can be compressed by this procedure, all bleeding is stopped and its recurrence absolutely prevented.

For recurrent small hæmorrhages, whether from tuberculosis or bronchiectasis, if the disease is unilateral, some form of collapse therapy is the best. First and foremost comes artificial pneumothorax. This is simple, painless, and safe. If not hindered by adhesions, it will stop hæmorrhage and it will promote healing. There is no point in delaying this treatment, for everything is to be gained by it. If, because of adhesions, an artificial pneumothorax cannot be obtained, phrenic evulsion and thoracoplasty may have to be considered. Apart from these measures the patient must avoid strains, excitement, and alcohol. Yet, not infrequently, hæmorrhage will occur when the patient is at complete rest. Calcium may be given, for example, calcium chloride grs. x., calcium lactate grs. x., three times a day, and this, I believe, to be of great help. In conclusion, the fear inspired by a big hæmoptysis must not be forgotten. Our efforts to control a hæmorrhage must never subject the patient to further risk; insistence on the prone position, for example, may cause great suffering and almost choke the patient, and, moreover, make it difficult for him to eject the blood. An overdose of morphia may be disastrous by promoting aspiration, while injections of serum may produce intolerable urticaria. While one should never remain passive and inactive in these cases, a fussy interference may do more harm than good. The injection or application of one of the above-mentioned remedies at *regular* intervals undoubtedly gratifies both the patient and the relations. The best way to treat a hæmoptysis is to prevent it. This may be impossible, as hæmoptysis is sometimes the first symptom. When there is a known focus from which a recurrent hæmorrhage is arising, artificial pneumothorax treatment should be attempted without delay in some cases, even if the disease is bilateral.

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Special Articles.

STUDIES OF VIRUS DISEASES.

THE MEDICAL RESEARCH COUNCIL'S SURVEY OF THE POSITION.

No part of the work directly promoted by the Medical Research Council has greater biological interest at the present time, or more vital practical importance for the cure and prevention of disease, than the inquiries now being made into various diseases in animals and man caused by the so-called "viruses." These inquiries are concerned with an invisible underworld of bodies that in size stand somewhere between the largest known molecules of dead organic matter and the smallest microscopic bacteria. These cannot be seen as definite structures by ordinary microscopic means, and the relation to them of certain objects made visible by special optical methods is still a matter of discussion. They are called "filter-passing" because many of them will traverse a filter fine enough to hold back and strain off ordinary bacteria from a fluid containing them.

Whether these "viruses" are organised as minute, ultramicroscopic bodies is still an open question; in any case, they are presumably too small to have an organisation similar to that of such cells as have hitherto been regarded as primary units of living matter. Nobody has yet succeeded in preparing an artificial fluid which will, by itself, provide conditions in which these viruses will reproduce themselves and multiply; some of them, however, will grow in artificial conditions if a piece of surviving tissue, taken from a freshly killed animal, is added to a suitable medium. It seems to be characteristic of a virus that it can multiply only in the presence of living cells which it can infect.

When the virus causing any disease is introduced into the animal, or the plant, in minute quantity, there may occur a rapid, unseen, and unexplained multiplication of it throughout all the parts of the organism attacked, since a minute portion of any of those parts will be found able to infect another similar organism.

TWO CONVERGING LINES OF EFFORT.

Those now working with viruses are under difficulties very like those that confronted bacteriologists two generations ago, before they had found adequate methods of microscopic study and of artificial cultivation. At present their endeavours may be thought of as following two converging lines of effort: (1) practical devices are sought by which empirical imitations may be made of the immunity to a second attack of a virus disease that most commonly follows recovery from the first attack under natural conditions; (2) investigation is made by every known method into the physical properties and natural history of the virus itself.

Attempts to Produce Immunity.

The particular historical method of using cow-pox as Jenner did to immunise against small-pox in man has not so far been found applicable to other virus diseases. Small-pox adapted to living in the tissues

of a calf becomes cow-pox, and when transferred again to human beings it shows no tendency to revert to small-pox. The alteration in the character of the virus seems irreversible. In the other viruses that have already been studied, although there may be a diminution of virulence by propagation in the bodies of animals which are not their customary hosts, this is not an irreversible change, and we cannot be certain that their former virulence will not return when they are transferred once more to the susceptible animal.

Immunologists have again and again tried to produce immunity with virus material that has been acted upon by various chemical agents (especially those known to kill bacteria) until it is incapable of reproducing the disease when injected into a susceptible animal, and has presumably therefore been killed. The first successful use of this method was by Fermi in Italy about twenty years ago with a rabies virus treated with carbolic acid. In the last few years the work in the Council's Farm Laboratories, Mill Hill, on canine distemper has followed these lines: Dr. P. P. Laidlaw and Mr. G. W. Dunkin use for a protective injection a virus made harmless by formalin. At the National Institute for Medical Research Dr. Charles Todd has also lately shown that two or three inoculations of the virus of fowl plague which has been treated with carbolic acid and glycerin until it is no longer capable of giving the disease to a fowl, makes the bird so resistant to the disease that the subsequent injection of 300,000 times an otherwise fatal dose of infective virus leaves them unharmed.

These two examples of protection, against dogs' distemper and fowl plague, have led to the successful use of closely similar methods in the protection of monkeys against yellow fever. It is still doubtful, however, whether a treated vaccine derived from "monkey" virus, although it was originally derived from human yellow fever virus, will protect men. Immunity from rinderpest, again, can be given to cattle by a treated virus, but this bovine virus is ineffective for goats or pigs. This "specificity" of viruses offers many baffling problems which are not so prominent in the field of bacterial infections.

Thus in canine distemper the infection can be passed to and fro indefinitely from dog to ferret and back. Suitably "attenuated" virus of dog will immunise dog, and that of ferret will immunise ferret, but equivalent results are not got when the ferret "vaccine" is used for dogs, or vice versa. The practical results in the prevention of dog distemper depend upon the device just mentioned of securing temporary immunity by "attenuated" virus which is quite harmless, and of giving during that immune period some full virus which now brings lasting immunity to distemper, without inflicting the disease itself except in shadow form.

Unfortunately, these methods are not applicable for various reasons to other virus diseases, such as foot-and-mouth disease or measles, or to the plagues of influenza and of "common colds" that are believed by some to be virus diseases. As to foot-and-mouth disease, it has already been found that immunity can be given by treated virus, but inasmuch as the disease itself, unlike most virus diseases, gives no lasting immunity, this has a limited value. Moreover, at least three different types of virus exist, and the effects of one do not protect against the others. As to measles, the only animal that is affected by the virus is apparently the monkey, but it seems also that the disease cannot thereafter be passed from monkey to monkey. If influenza, as many believe, is a virus disease, progress is barred at present, since it appears not to be transmissible at all to animals; and this, in view of the complete impracticability of extensive human experiments, forbids the experimental method that is essential to any measurable advance.

The Nature of the Virus Particles.

In the meantime close investigation is being made by every available method of the actual nature of the virus particles—for we know them to be particulate in the sense that they are acted on by gravity in a watery suspension. Methods of direct physical examination of the nature and properties of viruses are being used. Mr. J. E. Barnard has made advances towards the better optical examination of virus by using shorter wave-lengths of light, outside the visible spectrum, with suitable devices to protect the virus under examination from the destructive action of the rays directed upon it and to secure photographic images. Side by side with these optical studies, efforts are being made by Mr. W. J. Elford, Ph.D., working under Mr. Barnard in the Department of Optics in the National Institute, to improve the methods of filtration, which offer physical problems of which the difficulty comes from the scale of minuteness that is involved. His general aim is to gain better methods of separating and of measuring virus bodies of different kinds.

Another line of inquiry lately pursued at the National Institute has been to examine the reactions that actually occur between the virus as such and the new substances ("immune substances" or "antibodies") that appear in the blood to counteract it, and by which immunity is gained.

In many bacterial diseases it is known that the toxin of the invading microbe can be neutralised by the antitoxin in the blood of the immune animal entering into some chemical combination with it. Dr. Todd, for the fowl plague virus, has shown that the virus can be made harmless by addition of the right amount of immune blood fluid. But so little is this a fixed chemical union that simple dilution with water makes the mixture again virulent. Similarly, Dr. C. H. Andrewes with vaccinia virus has shown that a neutral—i.e., non-infective—mixture of virus and immune substance can be separated out again by simple filtration, and by that means and also in other ways, the virus can be readily recovered in active form. It should be noted that some other observers, using different viruses, have found a firmer union between virus and immune substance, analogous to what is found for bacterial infections.

Another interesting line of inquiry has been that of finding the distribution of the virus in the blood. It has been shown that in certain diseases the virus does not float freely like a bacterial invasion in the fluids of the blood, but is wholly contained within the bodies of the white blood corpuscles. This is true in typhus, rinderpest, fowl plague, canine distemper, and vaccinia; in foot-and-mouth disease, however, the virus is almost wholly and at all periods of the disease found free in the blood fluid.

There is much reason from evidence of various kinds and values to think that in general the invading virus multiplies within the cells of the living animal or plant rather than in the body fluids. It has been mentioned already that no means have been found for the cultivation and reproduction of virus outside the body in artificial imitations of body fluids. Dr. C. H. Andrewes has lately used a method of studying virus infection out of the body by infecting with virus small fragments of animal tissue which are kept "surviving" in suitable fluid media. Evidence of infection is seen in the so-called "inclusion bodies" which are found microscopically in the tissue cells, and are exactly similar to the corresponding appearances that accompany infection by the same virus in the living animal. It can be proved that in a cultivation of this kind the virus actually multiplies itself. Work by this kind of method is actively proceeding and seems to hold great promise.

Virus Studies and Cancer.

Just five years ago the Council explained that as part of the general programme of inquiry into virus diseases which they had planned, Dr. W. E. Gye had taken up the study of the malignant growth in fowls known as the Rous sarcoma. The invisible and filtrable agent of this tumour when injected into a fowl multiplies indefinitely and gives rise to a new tumour formation, and presents in that and other ways the characters of a virus. In each subsequent year the Council have given a full statement in outline of his observations and the conclusions he had drawn from them. In their report last year they explained in some detail the manner in which he had more recently failed to obtain with certainty and regularity the results that in his earlier work had been consistent enough to lead him to a definite view of the mode in which a virus conveyed from a pre-existent malignant growth interacted with another factor in the invaded

cell to produce a new tumour. In the past year Dr. Gye has made renewed efforts to find and remove the cause of discrepancies in his results, and has now, with the complete sympathy and approval of the Council, decided to leave this phase of his inquiry for the time being and to turn to other aspects of the problem.

AUSTRALASIA.

(FROM OUR OWN CORRESPONDENT.)

Appointments at Sydney.

THE new appointments to the three Bosch chairs [1] in the University of Sydney are as follows: Medicine, Dr. Charles George Lambie; Surgery, Mr. Harold Robert Dew; and Bacteriology, Dr. Hedley Duncan Wright. Sixteen applications, it is announced, were received for the chair of surgery, 17 for the chair of medicine, and 14 for the chair of bacteriology. These were considered in the first place by advisory committees in London, and the recommendations were unanimously adopted both by the special selection committee in Sydney and by the Senate. Dr. Lambie, assistant physician to the Royal Infirmary, Edinburgh, is lecturer in clinical medicine in the University. Mr. Dew, who was born in Melbourne in 1891, received his medical education in that city, and undertook post-graduate work in London after the war. He became Fellow of the Royal College of Surgeons of England in 1920, and gained the Jacksonian prize of the College in 1924. In 1927 he shared the award of the Syme research prize for observations on hydatid disease. Dr. Wright, a Tasmanian, received medical training at Edinburgh, where he graduated in 1916. On returning to Scotland after the war he was appointed lecturer in the department of physiology and was awarded the Lister research fellowship of the College of Physicians. In 1923 he became assistant lecturer in bacteriology at University College Hospital, London, and since 1928 he has been reader in bacteriology in the University of London.

Poisonous Spider Bite.

The death of a woman in Sydney as the result of a bite by a Trapdoor spider (*Atrax robusta*) has again brought to notice the danger of bites by these insects. There are three variety of spiders in New South Wales which are known to cause severe symptoms as a result of their bite. One is the common redback spider (*Lactrodectus hasseltii*) which is found throughout the country districts. The other two are trapdoor spiders, *A. robusta* and *A. formidabilis*. The former are common in the northern suburbs of Sydney, and the latter are found on the north coast of New South Wales. Though of the trapdoor variety these dangerous spiders live in holes with no trapdoor. The males seem to be nocturnal in habit which accounts for their getting in shoes and clothing which have been left lying about. In the present instance, the patient put her hand into an old shoe, and was bitten on the thumb of the left hand at about 8 A.M. She immediately collapsed and became cold, clammy and pulseless, and retched for an hour. She then became dyspnœic with some laryngeal spasm. She appeared to be mentally clear and complained of no pain, but stated that she had a feeling of numbness all over. The condition improved for about two hours and then peripheral stasis and cyanosis gradually increased. She was admitted to the Royal North Shore Hospital at noon, still conscious but cyanosed and very restless. At 2 P.M. she had become unconscious and laryngeal spasm, lasting half a minute, came on at half-hourly intervals. The cyanosis increased during the spasms and was accompanied by frothing at the mouth. She was very restless. By 4 P.M. she had Cheyne-Stokes' respiration, and shortly after 5 she died suddenly.

There have been several instances within recent years of death after bites from trapdoor spiders, but it is believed that this is the first time an adult has died from the bite.

Infant Welfare Centres in Australia.

Dame Janet Campbell has completed her investigation of maternal and child hygiene in Australia, and her report to the Commonwealth Government has been issued. Its main provisions will no doubt already be familiar to your readers. She would like to see a medical woman directing a special division of the Commonwealth Department of Health charged with extension and improvement of work for maternal, infant, and child hygiene. Both Commonwealth and State Governments must be prepared to spend more money to secure those essential facilities which the personal resources of the people themselves are unable to supply. Infant welfare centres are very similar all over Australia. The accommodation is good, and in some of the specially constructed buildings the equipment is almost luxurious. The clean and cheerful appearance of the centres makes them very attractive, and must do much to encourage attendance by the pleasant conditions under which the work is carried on; most of the centres resemble private clinics and are very different from some of the busy and crowded municipal centres in Britain. There is also the fact that they are attended by women of all social classes; there is no sharp dividing line of poverty as in England, to separate the Australian mothers into different groups; it is fully recognised that the well-to-do mother is often just as much in need of advice as her poorer sister, and the facilities offered are such as to encourage her to take advantage of the valuable assistance provided by the centre. On the other hand, although there is a certain amount of more or less perfunctory medical control, there is none of the close medical supervision which in England is regarded as essential to satisfactory work. In the English welfare centres there are always regular "medical consultations," and the whole of the advice given is subject to medical direction. The baby is always examined by the doctor when first brought to the centre, and at regular intervals afterwards, even if apparently making good progress. Lack of similar medical control in Australia may be due to the fact that practically all mothers in attendance have their own family doctors to whom the baby is taken in the case of illness; moreover, the centres have a strictly limited function and are merely striving to keep the healthy baby well, and have no concern with the cure of disease. There is another factor not easily assessable—namely, the difficulty of securing the services of a medical practitioner who is specially trained in infant welfare, and who is not in private practice in the neighbourhood. Dame Janet praises the work done by the National Council of Women, the Bush Nursing Associations, the Country Women's Associations, and the Australian Inland Mission, under the auspices of the Presbyterian Church; she puts in a good word for the ambulance services in Queensland. But it is not to be denied that Australia provides a difficult problem in establishing a general scheme of maternal and child welfare on account of the immense distances and comparatively small scattered population. Dame Janet's report will do good in crystallising the feelings and desires of maternal and child hygienists in Australia. The courtesy of your Ministry of Health in allowing her to visit Australia has been deeply appreciated here as an Empire-welding gesture.

[1] See THE LANCET, 1929, i., 1377.

CONTRIBUTIONS BY HOSPITAL PATIENTS.—The sum contributed by patients of the Royal South Hants and Southampton Hospital who do not belong to any contributory scheme was formerly about £350 a year, but the appointment of a lady almoner last year sent up the amount to over £1600.

MEDICAL SOCIETY OF LONDON.

ANNIVERSARY DINNER.

THE 157th anniversary dinner of the Medical Society was held on March 6th at the Hotel Cecil, the President, Mr. Donald Armour, presiding. The guests included the President of the Royal College of Physicians of London, the Master of the Society of Apothecaries, the Regius Professors of Medicine at Oxford and Cambridge, the Directors-General of the Navy, Army, and Air Force, the President of the British Medical Association, Mr. Lucian Pacaud (High Commissioner for Canada), Colonel J. L. Ralston (Minister of National Defence for the Dominion), Mr. W. C. Noxon (Agent-General for Ontario), Mr. Wilson Cross (President of the American Society in London), the Presidents of the Royal Society of Tropical Medicine and Hygiene, Harveian Society, Medico-Legal Society, Hunterian Society, West London Medico-Chirurgical Society, and Chelsea Clinical Society, the chairmen of the National Hospital, Queen-square, and the West London Hospital, Sir Lindsey Smith, and the Editors of *Canada*, the *British Medical Journal*, and *The Lancet*.

Sir Humphry Rolleston proposed the toast of the Medical Society of London. A good wine, he said, needs no advertisement, and the Medical Society admirably illustrates the law of the survival of the fittest, for, when founded in 1773 for 30 physicians, 30 surgeons, and 30 apothecaries or general practitioners, there were quite a number of other medical (or *physical*) societies, while it is now the only one left. It is the oldest medical society in London with the solitary exception of the Guy's Physical Society, and it is interesting to note, as showing that Guy's men are very clubbable men, that in Medley's picture of the 22 Founders of the Medical Society a quarter are Guy's men. Among the virtues of the Society is celibacy—though not for want of offers to join up nearly a quarter of a century ago with the Royal Society of Medicine—and its stern virtue no doubt played part in its contrary decision. Medley's portrait also shows another tradition of the Society now fallen into desuetude, and the President will perhaps explain why that high officer no longer wears his hat at all meetings. The Society is now in its 157th year, and has recently flourished in a remarkable degree, increased mightily in its members, and more than lives up to its high traditions, results due to the devotion of its officers. With its chief officer, Mr. Donald Armour, this toast is coupled. He is a great surgeon, exploring the brain with high intent or laying bare the misdeeds of the spinal cord—he was indeed the first Lettsomian lecturer to take that region of surgery as his subject.

Mr. Donald Armour, in reply, said that in thanking the proposer of the toast, who, himself, had once occupied the Presidential chair of the Society, for his flattering references, he would be brief in deference to the Society's rules. When that altruistic Quaker, he continued, John Coakley Lettsom, founded the Society, he said of its utilitarian objects: "Nothing has contributed more to the advancement of science than the establishment of literary societies; these excite a generous ardour in liberal minds, and raise even envy itself into useful emulation." Having launched the Society, it was necessary to provide it with rules and regulations. Judging from the numerous and protracted meetings held for this purpose, it was obvious that there were differences of view, but Lettsom, whom his biographer, Pettigrew, has described as "the uniform pacificator of all differences . . . rarely failing in effecting an adjustment of them," lived up to his reputation, and order finally came out of confusion; but it is significant, as proving the length and warmth of these discussions, that the first scientific paper read before the Society by its first President, Dr. John Millar, was entitled, "Observations on the Loss of the Voice." Having settled their differences and recovered their voices, the Society settled down to pursue its vocation in peace until, in 1786, an Irishman, one Dr. James Sims, was elected President. He is described as "a good-humoured, pleasant man, full of anecdote, an ample reservoir of good things, and for facts and figures a perfect chronicle of other times." In transatlantic parlance this Irishman must have been a "good mixer." At any rate, he mixed the ballot box so successfully that he occupied the Presidential chair for 22 consecutive years. Being an Irishman, his was at first probably a beneficent despotism. But later, when it became an autocracy, the inevitable happened—revolution, fortunately, a bloodless one. Some of the younger Fellows, despairing of the retirement or demise of this Irish dictator, broke away, and in 1805 founded the Royal Medical and Chirurgical Society, the nucleus of the Royal Society of Medicine. Having purged itself of malcontents, the Medical Society of London has continued ever since along peaceful lines, growing yearly in strength and stature, and always adhering to the purposes of its foundation, as laid down by Lettsom himself—namely, "to give the practitioners in the healing art frequent opportunities of meeting together, and conferring with each other concerning any difficult or uncommon cases which may have occurred; or communicating any new discovery in medicine, which has been made, either at home or abroad." And we still pride ourselves upon what I may call, professionally speaking, the cosmopolitan character of our meetings. Unlike our rebel offspring, now grown to Gargantuan proportions, we are not "sectionists," we do not work in watertight compartments, we do not encourage specialism as such, our discussions are not limited to any part of the human body, to any age, nor to either sex. In this Society we have a small and jealously guarded list of Honorary Fellows, and we have made a single addition to it this year, the first in three years. I refer to Sir Arthur Keith, just now absent in Egypt; we are anticipating with the greatest pleasure his oration before the Society in May on "Modern Medicine and Evolution." I conclude my remarks with a confession, which is in no sense an appeal; but I hope that it will be an appealing confession. In our home we have a Cinderella, waiting these many years for the clothing that her beauty and her rarity deserve. In hopeful expectancy we anticipate the coming of some fairy godfather, or godmother, or both, who will provide her with proper coverings to preserve her for all time. I refer to some of the priceless contents of our library. They comprise thirteenth century manuscripts and printed books dating from 1471. I should like to start a "free-trade" crusade—free trade between the lovers of books, who have money to spare, and our library that needs it for the care of our valuable books and manuscripts. Thus our Cinderella might have her fairy slippers, and the Fellows of the Medical Society live happily ever after.

The toast of the Guests was proposed by Dr. Eustace M. Callender, also a past-president of the Society, who referred to the high position occupied by many of their guests, and who coupled the toast with the name of Colonel Ralston, whose great abilities as legislator and lawyer, he said, were now recognised as his qualities as soldier had been recognised throughout the recent war. Colonel Ralston, in his reply, referred to the presence of Canadian guests as due to the long and high association of the President's family with the Dominion, and showed that a sound legislator and a brave soldier could be also a witty man.

CITY OF LONDON MATERNITY HOSPITAL.—A series of post-graduate lectures will be given at this hospital at 6 P.M. on Tuesdays from March 25th to June 10th. The lecturers will be Dr. Abernethy Willett, Mr. R. Christie-Brown, Mr. McKim McCullagh, Mr. Arnold Walker, Mr. Harold Burt-White, Dr. Sydney Owen, and Dr. H. C. Lucey.

Correspondence.

"Audi alteram partem."

VARIOLA MAJOR AND MINOR.

To the Editor of THE LANCET.

SIR,—I have read with much appreciation the paper by Dr. R. W. Jameson, appearing in your issue for March 8th. I wish strongly to support his contention that the time has come when the distinction between the two forms of small-pox, major and minor, should be officially recognised. As he points out, whilst it may not be easy to decide the nature of the first case in an outbreak it should always be possible to decide after a series of cases have occurred. I believe that no real doubt exists about the nature of any outbreak which has occurred in this country since the war, and it is only in the post-war period that the existence of variola minor as a distinct form of small-pox has been suspected. Dr. Jameson draws attention to the confusion and other disadvantages resulting from the present plan of calling both forms "small-pox," without distinction. We may well ask what value our present case-mortality statistics will have in years to come when it will be impossible to know what proportion of the cases lumped together as "small-pox" were of the major or minor variety respectively. The terms "variola major" and "variola minor" have, as Dr. Jameson states, been accepted in the last Decennial International Conference on the Nomenclature of Causes of Death, and I venture to suggest that the Ministry of Health would be moving in the right direction if they invited medical officers of health in reporting small-pox cases to specify whether the cases were major or minor.

I am, Sir, yours faithfully,

C. KILLICK MILLARD,
Medical Officer of Health.

Health Offices, Leicester, March 11th, 1930.

PROTECTION AGAINST MEASLES.

To the Editor of THE LANCET.

SIR,—Your interesting leading article last week is a valuable contribution in the study of immunity, but raises one or two practical considerations in relation to private practice. "The importance of this work," you say, "lies in the fact that it brings the sero-prophylaxis of measles within the range of measures practicable to the family doctor, for one or other of the parents is almost certain to have had measles, and thus the donor is immediately available." That is to say, we are now considering the individual child or family.

That a parent's serum may still carry the immunising properties is so convenient that the procedure should be quite simple. But it is an important consideration how long any such passive immunity may last; because measles is a very harmless disease in small children, when efficiently treated—that is to say, in bed, in a room that is really warm, with a minimum of washing—whereas in young adults it tends to be much more serious, and most of us know of fatal cases. I believe that the most experienced medical officers of public schools are afraid of the boys who have not already had measles. I believe the evidence that measles should be treated at home during childhood, rather than at school or in lodgings or hospital later on, is so convincing that prophylactic inoculation against measles, producing a short-lived passive immunity, is a doubtful advantage for young children, who might otherwise have developed an active immunity by having measles at home with no disadvantage other than the loss of a few Christmas parties or some day-school lessons.

A short-lived passive immunity might be of the utmost importance in exceptional circumstances—for example, shortly before a scholarship examination or a family holiday—but for the latter the possibility of only obtaining an "attenuated measles after a long incubation period" might make the dates more inconvenient. A fellow student of mine, some 30 years ago, developed measles at an awkward time in his medical curriculum, and his father, who was a doctor, told me he would deliberately expose his children to the infection of such illnesses, if he could have his time over again. Without going as far as this, if I were advising the medical profession with regard to their own children, I should say that the first time a child is exposed to the infection of measles is probably the most convenient and the safest time to have the disease. To prevent that attack, with a short-lived immunity, leaves an added responsibility for the future, and should only be attempted when some exceptional circumstances make measles particularly unfortunate at that season.

When a child develops measles in a hospital ward sero-prophylaxis would be invaluable for the other children, because the administrative responsibilities of measles in a children's ward are very serious.

I am, Sir, yours faithfully,

Derby, March 10th, 1930. HUGH BARBER.

SOCIAL CUSTOMS AND INFANT MORTALITY.

To the Editor of THE LANCET.

SIR,—Indian obstetrical methods and social usages have come in for severe and entirely unmerited criticisms in THE LANCET in a note on a contribution to the *Hibbert Journal* by Miss Eleanor Rathbone entitled "Has Katherine Mayo Slandered Mother India?" Miss Mayo's book having received previously a favourable notice in the same paper. We did not take these uninformed and biased criticisms seriously, but now they have begun to colour all official and unofficial health reports.

The constructive suggestions made in THE LANCET about the education of women and the training of the indigenous *dai* are valuable, if by education is meant real education; but it seems almost incredible that THE LANCET, while discussing the death-rate of Indian infants, should have sedulously omitted all reference to the appalling economic conditions, and trotted out Indian social customs as the sole cause of the high Indian death-rate. That social customs, good, bad, or indifferent, have comparatively little effect on the health of the people and that proper nourishment is the all-engrossing factor, form an obvious proposition. In 1925 the Mississipi inundated a large tract of country and the Government of America pressed into service a flotilla of aeroplanes and dropped tinned provisions to the sufferers. A serious development of pellagra occurred, not as a result of starvation but due to lack of vitamin B in the diet during the short period of relief. Who argues that this absence of stamina on the part of the American people was to be ascribed to their social customs? Also who has ever heard in India of the occurrence of a single flood leaving the people in the grip of pellagra? Judged by this incident Indians have the greater stamina, so that, if social customs are the dominant factor, American social customs make a poor show by comparison. Again, during the great European war the central States of Europe were compelled to go without some only of the essential foodstuffs for not even four years. This short course of restricted diet broke down the constitution of the populations so completely that for years afterwards Vienna, for example, showed an immense rise in the occurrence of rickets and tuberculosis. If this is to be laid at the door of social customs the sooner European social customs are improved the better. The people of India have, with their social customs, been inured to hardships and privations of every sort, and from their cradle been faced with famine and flood.

I undertook last year a private census of 800 births amongst persons with an average income of L.200 a

year, all of whom adhered to traditional obstetric methods and the infamous *dai*. The deaths numbered 28·75 per 1000, whereas the general death-rate in England among infants is 70 per 1000. My private figures are corroborated by an official investigation undertaken at the instance of the Director of Public Health, Madras (*Indian Medical Gazette*, October, 1929). In four cities of the Madras Presidency (Madras, Madura, Coimbatore, and Trichinopoly), taking an unselected population of 183,000 (predominantly Hindu), there were over 7300 births in all. It was found that the death-rate of infants varied inversely with the income. Thus in families with incomes of Rs.25 or less, the death-rate was 120 per 1000. In those with incomes between Rs.25 and Rs.50 it lessened to 105 per 1000, while in families with incomes above Rs.50 per month (corresponding to the magnificent sum of £3 17*s.* per month) the death-rate dwindled down to 84 per 1000—i.e., only two-thirds of the normal death-rate in the case of the poverty-stricken and half-fed masses.

The results of the Madras investigation are entirely in keeping with those of the private inquiry held by me, and, if figures can prove anything, they establish beyond the possibility of a doubt that the stomach alone controls the mortality of infants, and that all the other factors combined count but as a feather in the balance. It passes all sober comprehension how anyone, least of all a medical man, professing to talk about the causes of a high death-rate of suckling infants and their mothers, can talk only of deficient medical aid and unhygienic social customs, oblivious of the abject and crushing poverty, of the meagre and poor dietary, leading to chronic malnutrition, verging on to starvation, and of the recurrent horrors of widespread famines and ravaging floods, accentuated by the no less fell ravages of that scourge, malaria.

Perhaps it is not too much to hope that, in a scientific paper of the standing of THE LANCET, the issue here raised will be met squarely.

I am, Sir, yours faithfully,

NALINI RANJAN SEN GUPTA, M.D.

Feb. 15th, 1930.

*** From Dr. Sen Gupta's communication we have only been able to find space for the relevant paragraphs, which correct, as he believes, the faulty impression given by the editorial article in THE LANCET.—ED. L.

SPINAL ANÆSTHESIA.

To the Editor of THE LANCET.

SIR,—I have followed the recent correspondence with interest and with such understanding as the very involved communications allowed. The recent paper on high spinal anæsthesia by Koster and Kasman is startling in its simplicity, and if their results are confirmed, the position should be freed from much of its present obscurity. In the meantime, whatever may be the effect of anæsthetic solutions on the respiratory centre, it is no longer possible to regard paralysis of the diaphragm as a cause of death. I have under my care a patient whose diaphragm is completely paralysed as a result of bilateral phrenic evulsion and whose respiration is in no way embarrassed. Similar results have been recorded by continental surgeons, and the case is recorded merely because it seems to call for some measure of revision of the current theories of respiration.

I am, Sir, yours faithfully,

Omdurman, Feb. 22nd, 1930. L. O'SHAUGHNESSY.

FOOD OR DRUG?

To the Editor of THE LANCET.

SIR,—It is indeed disappointing to find THE LANCET ranged on the side of a bureaucracy which is interfering, I submit unwarrantably, with the professional freedom of practising doctors. The narrative of "one of the four offenders," as set out in your last issue surely reveals a very disquieting state of affairs. I think the inference is inevitable, that these prosecutions for excessive prescribing are largely the result of the arrangement made in 1927 by the then Minister of Health with the dispensing pharmacists. Prior to that date the Drug Fund had always been overdrawn, the natural consequence of its essential inadequacy, but the overdraft had been to some measure met by discounting the bills for dispensing presented by pharmacists on the panel. This very unfair treatment of the pharmacists was remedied by the agreement of 1927, and the pharmacists' fees for dispensing are now a first cost upon the Fund. But there is now actually less money to be spent upon drugs than before and it has become increasingly impossible any longer to camouflage the inherent bankruptcy of the National Health Insurance Fund.

There is a very pertinent observation upon this kind of treatment of panel doctors under the National Health Insurance Acts in Lord Hewart's recent book "The New Despotism" (p. 50). He writes, "'Excessive prescribing,' an offence wholly unknown to the law, which consists in prescribing for the patient medicines that are either too expensive in quality or too liberal in quantity, is one of the things for which a doctor may be penalised. One might think that, for a person who is bound by law to insure and pay contributions under the Acts, the best medicine ought to be prescribed in illness. But apparently that is not always the view of the department. One might wonder whether, in this matter, the interests of the patients are adequately taken into consideration."

You write in your annotation of March 1st, "Those who administer the Acts are agreed that insured persons should get as good treatment as do private patients," but this statement seems to conflict with another sentence in the same leader: "The referees held that the wholesale administration of cod-liver oil *in insurance practice* (the italics are mine) was only legitimate as an experiment, conducted under experimental conditions." This dictum is rather cryptic, but it expressly makes a distinction between insurance and other practice.

I may say that I have asked a question in the House upon this case and have had a personal talk with the Minister of Health, who, while not committing himself in any way, has shown an attitude of sympathy contrasting favourably with the curious aloofness, not to say hostility, displayed by the official medical journals to the practitioner thus penalised.

I am, Sir, yours faithfully,

E. GRAHAM LITTLE.

House of Commons, March 11th, 1930.

*** As a reference to our Parliamentary Intelligence will show, the power to withhold remuneration from insurance doctors on account of excessive prescribing has been exercised by the Ministry of Health since medical benefit first came into operation in 1913. This power in the Minister's view involves no limitation of the scope of medical benefit. Whether or no the practitioner accepts this dictum he must realise that he can only draw more than his share of a limited fund at the expense of the patients of neighbouring practitioners. A correspondent last week convicted us of a regrettable slip in our statement of the composition of the tribunal. Unlike the committee which inquires into complaints against a practitioner, there is no requirement that the referees in these prescribing inquiries should include a barrister or solicitor. The two requirements are that they shall not exceed three in number, and that they shall not include an officer or officers of the Ministry. The same correspondent last week made the point that the referees are appointed by the Minister and are therefore not independent. This has, of course, applied from the commencement of medical benefit to all bodies set up for quasi-judicial purposes under

the N.H.I. Regulations, including the most serious case of all, that of removal from the medical list, and there has been no evidence hitherto that insurance practitioners generally regard it as unsound. While the regulation leaves the door open for the appointment as referees of laymen, it has been the practice so far to rely entirely on doctors, in view of the essentially medical nature of the question to be determined. The chairman of the committee of referees has always been a chairman of a panel committee who is known to have paid special attention to this subject; wherever possible the second referee has been a consulting physician with similar experience, and the third has always been a member of a panel committee.—ED. L.

REST IN THE TREATMENT OF GONORRHŒA.

To the Editor of THE LANCET.

SIR,—In reply to Dr. Priest, the point I wished to make was this. No longer should a doctor, when undertaking to treat a case of acute gonorrhœa, acquiesce without strong protest in foregoing his demand of absolute rest on the patient's part. It should be emphatically pointed out to the victim that refusing this, a most essential factor for obtaining an early and successful result, he was laying himself open to, and must take the responsibility for, any serious complication which was more than likely to ensue as a result of that refusal. Too often in the past this all-important demand and explanation has not been stressed, the patient's natural objection to lying-up being taken for granted, with the ultimate result that the doctor receives no recognition of his well-meant leniency, but on the contrary a discontented patient retails and details a long and disparaging story of the treatment received to a "second opinion."

I am, Sir, yours faithfully,

JAMES B. BYLES.

St. James's-place, S.W., March 4th, 1930.

TECHNIQUE OF TRANSFUSION.

To the Editor of THE LANCET.

SIR,—As a therapeutic agent the practice of blood transfusions has very greatly increased of late years. There can be no question but that it is of immense value and in some cases a transfusion may be repeated several times, and by whatever method it is done the mere prick of the needle gives no discomfort to the patient. The practice of introducing the needle into any type of vein can be easily acquired with a little practice; yet it is an extraordinary fact that the old method of dissecting out the vein is still being used. It wastes time, causes some discomfort to the patient, leaves a scar, and the disadvantage increases when several transfusions must be given. I have never yet seen a vein, provided sufficient time and trouble are taken to work it up, when it was necessary to dissect it out. It is surely time that this old and obsolete method should be given up.

I am, Sir, yours faithfully,

H. M. M. WOODWARD.

Harley-street, W., March 1st, 1930.

TAMWORTH HOSPITAL CONTRIBUTORY SCHEME.—Tamworth Hospital, which has had its own contributory scheme, has been compelled by financial considerations to join the big Birmingham scheme. Last year Tamworth raised £3617 in weekly pence, but so many contributors were in hospital for operations or were in-patients of the Birmingham hospitals, whose treatment had to be paid for by the scheme, that there was a loss on the year's working of £874. Birmingham thus received £2284 which left an insufficient balance upon which to run the hospital. In future, Birmingham will pay £3 a week for any patient it sends to Tamworth Hospital, the latter defraying medical and surgical fees.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. J. H. McDowall is placed on the Retd. List with the rank of Surg. Capt.

Surg. Lt.-Comdr. J. R. Brennan to be Surg. Comdr.

Surg. Lt. R. R. Baker to be Surg. Lt.-Comdr.

The following appointments are made: Surg. Lt.-Comdrs. R. W. Mussen to *Pembroke*, for R.N. Hospital, Chatham, and as bacteriological specialist, and H. Brown to *Pembroke*, for R.N. Barracks, Chatham; Surg. Lts. W. P. E. McIntyre to *Effingham* (on recommg.), L. P. Spero to *Vernon*, and D. C. Drake to *Godetia*.

ROYAL NAVAL VOLUNTEER RESERVE.

Proby. Surg. Sub-Lt. S. B. Levy to be Surg. Sub-Lt.

ROYAL ARMY MEDICAL CORPS.

Lt. G. L. Grieve is placed on the half-pay list on account of ill-health.

Lts. J. F. Wilde and W. A. Kerr (temp. commns.) to be Capts.

J. C. Macfarlane to be Lt. (on prob.).

TERRITORIAL FORCE.

Lts. R. Pollok and W. R. Ward to be Capts.

To be Lts.: G. A. F. Holloway (late Offr. Cadet, Univ. of Lond. Contgt., Sen. Div., O.T.C.), D. N. Nicholson (late Cadet, Edinburgh Academy Contgt., Jun. Div., O.T.C.), and P. J. May.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Capt. J. Kerr to be Capt.

ROYAL AIR FORCE.

The undermentioned Flight Lieutenants are granted permanent commissions in this rank: A. L. St. Aubyn McClosky, J. M. Ritchie, and B. B. Kennedy.

Air Vice-Marshal David Munro, Honorary Surgeon to the King, is placed on the retired list at his own request.

Flight Lt. J. R. Williams (Temp. Capt., General List, Army, Dental Surgeon), relinquishes his temporary commission in the R.A.F. on completion of service.

INDIAN MEDICAL SERVICE.

Capt. A. Ba Thaw to be Maj.

Lts. W. J. L. Neal (prov.) and B. Shanker to be Capts.

Lt. (on prob.) V. T. J. Lynch relinquishes his prob. appointment.

COLONIAL MEDICAL SERVICES.

Promotions and Transfers: Dr. P. S. Selwyn-Clarke, Chief Health Officer, Federated Malay States; Capt. A. V. Greaves, Bacteriologist, Hong-Kong; and Dr. B. M. Johns, Professor, Clinical Surgery in the College of Medicine, Singapore.

The following new appointments have been made: Dr. W. C. O. Hill, Professor of Anatomy, Medical College, Ceylon; Dr. F. W. Gilbert, M.O., Northern Rhodesia; Dr. E. N. O'Neill, M.O., West African Medical Staff, Sierra Leone; Dr. D. R. McPherson and Dr. H. B. C. Wallace, M.O.'s, Straits Settlements.

DEATHS IN THE SERVICES.

Lieut.-Colonel George Hart Desmond Gimlette, C.I.E., late I.M.S., died at Southsea on March 7th, aged 74. He was the son of the late Fleet-Surgeon Hart Gimlette, R.N., and qualified with the M.R.C.S. Eng. and L.S.A. in 1877. Two years later he graduated M.D., M.Ch. at the Royal University of Ireland and joined the Indian Medical Service. In 1882 he took part in the Egyptian campaign and was present at the engagements of Tel-el-Kebir and Zagazig (medal with clasp and the bronze star). Till the autumn of 1883 he was employed in Egypt on special cholera work and afterwards went to Khatmandu as Residency Surgeon and ex-officio Assistant Resident. In 1891 he became Agency Surgeon in Baghelkhand, and subsequently he went to Indore in the same capacity. From 1901, when he was made a C.I.E., to 1908 he was at the Hyderabad Residency. He retired in 1910, but during the late war he served as P.M.O. of H.M. hospital ship *Sicilia*, and in France, Egypt, and Gallipoli. In 1917 he was re-employed in the I.M.S. as Residency Surgeon, Mysore, but afterwards returned to military duty in Mesopotamia.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

THE MENTAL TREATMENT BILL.

ON Thursday March 6th, the Mental Treatment Bill was further considered by Standing Committee A of the House of Commons. Mr. CECIL WILSON was in the chair.

Boarders "Incapable of Volition."

On Clause 2 (notice of reception, death, and departure of voluntary boarders and provisions as to boarders who become incapable of volition).

The debate was resumed on the amendment moved at the previous sitting of the Committee by Sir Boyd Merriman to leave out the word "volition" in Subsection (3) and to insert instead thereof the words "voluntarily submitting himself to treatment."

Sir BOYD MERRIMAN said that the Minister of Health had now put down on the Paper a series of amendments which really met the point which he (Sir Boyd Merriman) was trying to raise, but in a slightly different way. The Minister was suggesting the words "expressing himself as willing or unwilling to continue to receive treatment." The doctor would have to express himself in terms that he found the patient incapable of expressing his willingness and that would be the test. He (Sir Boyd Merriman) saw no objection to the form of words, but he would like to make this qualification, which applied to either form of words, that it might be necessary to make it quite clear that this incapacity was due to mental disorder. That point might, however, be left over for further consideration on the Report stage.

Mr. GREENWOOD (Minister of Health) said that he gathered that the Committee would be willing to accept his alternative form of words which were almost precisely those which would have been used in the definition had they defined the term "incapable of volition" later in the Bill. The words had been carefully considered in the light both of the medical and the legal issues involved. He would certainly look into the qualification mentioned by Sir B. Merriman.

Sir BOYD MERRIMAN withdrew his amendment.

Mr. GREENWOOD moved his alternative form of words, which were agreed to.

The "Ins" and "Outs."

Lieut.-Col. FREMANTLE moved in Subsection (3) to leave out the words "one month" and to insert the words "six months." He said that this was to meet the case of the patient, who, coming in as a voluntary patient, lost volition. As the Bill stood it recognised that there might be a chance of matters changing within a month, and consequently that period was given for the patient to change his condition without having to be certified or discharged. Medical experience showed that one month was not long enough for this purpose. That was the deliberate view of the medical superintendents and was also the experience of the London County Council. He would, therefore, ask the Minister if it would not be possible to enlarge the period to six months so as to give the cases which were medically described as the "ins and outs" a chance.

Mr. GREENWOOD said that it was a very serious thing where a person had gone voluntarily into an institution, and then later if he became incapable of expressing himself as to whether he wanted to go on being treated there or not, to detain him for a long period. He thought in view of Clause 5, where treatment would be available without certification, the Committee would be well-advised to let the period of one month stand, because he would be sorry if the question of the liberty of the subject were to be raised again.

Dr. HASTINGS said that the matter did not seem quite clear as the Minister had left it, because in the cases described by Col. Fremantle it would be very difficult to imagine that the mental condition of the individual could be truly explained by saying that he was incapable of expressing himself as willing or unwilling to continue to receive treatment. In other words, there would be a great many cases which could be dealt with by Clause 5 if those words were accepted. The cases which, after being admitted to the hospital voluntarily, became definitely though temporarily insane, and were very clearly able to express themselves as being unwilling to continue to receive treatment, could not, it seemed to him, come under Clause 5. As the Bill stood at present, with the new wording which the Minister had put into it, cases which became temporarily insane and desired to get out had to be certified after a month. He could conceive many people suffering from temporary insanity which one felt quite sure would come right, yet who were far from being able to express themselves as willing or unwilling to continue to receive treatment.

Sir BOYD MERRIMAN said he believed there was a quite simple explanation of the difficulty. They had to bear in mind all through, that assuming every case was a case of mental disorder, if through that disorder a man definitely refused to be treated he was to be certified. There was no escape from that. They were discussing here the length of time during which a man might be detained after he had become incapable of voluntarily continuing his treatment. If steps were taken to keep him under treatment he must be dealt with under Clause 5, or by certification. He agreed with the Minister that they must stick to the period of one month in order not to raise the question of the liberty of the subject.

Lieut.-Col. FREMANTLE withdrew his amendment.

Suggested Amendments.

Lieut.-Col. FREMANTLE moved in Subsection (3) to leave out the words "or steps have been taken to deal with him." He said he moved the amendment on behalf of Dr. Veron Davies, who felt very strongly on this point. His hon. friend wished to leave out as much as possible the control over the patient which was provided in the first four Clauses.

Mr. GREENWOOD, in resisting the amendment, said that the effect was really to cut out the express provision that in the circumstances dealt with in the Subsection a voluntary patient should be discharged, and they left him either under the principal Act or with treatment under Clause 5.

The amendment was negatived.

Lieut.-Col. FREMANTLE moved in Subsection (3) at the end to insert the words: "Provided that any written declaration by him, if he is over sixteen years of age when he was capable of volition, desiring that in the event of his losing volition his status should for a period of six months remain unaltered, be legal and binding on all concerned." He said this was really the third effort he had made on the same point. He had tried to make out the best case for those with experience, the Medico-Psychological Society. If they would not allow patients after they had lost volition to remain without further treatment for more than one month, would they do so if while the patient was still of full volitionary power he signed a definite application stating: "in case I lose volition for a period and you think I am recoverable, I want to remain under the same conditions in the same status of treatment"?

Mr. GREENWOOD said this was a very far-reaching amendment which was going to change entirely the method by which they had treated voluntary patients hitherto. It also raised controversial issues. While the proposal might appeal to many medical men, it was a very serious thing that a person should beforehand, so to speak, sign away his liberty. The case ought to be considered on its merits when the patient arrived at such a state that he was incapable of looking after himself. He hoped that the hon Member would not press his amendment.

Lieut.-Col. FREMANTLE said most clearly the interests of all those who had asked him to move this amendment was to get the Bill through, and obviously if it did not commend itself to the Minister and the Committee in general it was not likely to get through the House. But the point having been raised it could be raised again later on some years hence in connection with an amending Bill. He asked leave to withdraw the amendment.

The amendment was withdrawn.

Dr. VERNON DAVIES moved in Subsection (4), after the word "such" to insert the words: "or fail to remove such person from the institution, hospital, home, or place when so requested in writing by the person in charge." He said he thought the new words would strengthen the Bill. There might be careless and incompetent guardians not very much interested in the case of a minor once they had got the patient under treatment.

Mr. GREENWOOD said he was not sure that the words would strengthen the Clause. He did not think that they added anything of value, but on the other hand, if they might be open to misunderstanding and all that could be brought within these words would be found in the word "duty" in the Subsection. He could not accept the amendment.

The amendment was negatived.

Mr. KINLEY moved an amendment to Subsection (4) to provide that the local authority should be consulted by the Board of Control in cases where a minor ceased to have a parent or guardian, or where the parent or guardian was incapable of performing, or refused or persistently neglected to perform, their duty.

Mr. GREENWOOD said the effective coordination desired by Mr. Kinley could be secured without this amendment and he imagined that the amendment might make it very difficult in many cases to secure any arrangements at all. One aspect of the Board of Control was that of an independent safeguard

of persons who were in these institutions. If they were compelled to act in agreement with local authorities that immediately destroyed one of their important functions. This proposal would not work administratively.

Lieut.-Col. FREMANTLE said he sympathised with the object of the hon. Member, who moved the amendment, but he agreed with the Minister that it would be inadvisable to put the amendment into the Bill, because they were certain that the Board of Control would, whenever required, wish to be in touch with the local authorities and to make use of their machinery.

The amendment was negatived.

Penalty for Default.

Mr. KINLEY moved to leave out Subsection (5), which imposes a penalty not exceeding £5 on any person who fails to give any notice required under the clause for each day or part of a day during which the default continues. He said an offence, however serious, could not be dealt with except by a penalty not exceeding £5. The punishment, if it was to fit the crime, should not be limited to that figure.

Mr. GREENWOOD pointed out that the effect of the amendment would be not that somebody would receive unlimited damages, but that no one could be punished. If they were to administer the Act at all, those responsible for giving notice, whether it be of the reception or of the death of a patient, must be under some penalty if they did not carry out their duties.

Sir BOYD MERRIMAN said it should be made perfectly clear one way or the other whether the penalty was intended to cover Subsection (4) as well as Subsections (1) and (2). He suggested that they should insert words to the effect that a person should be liable if he failed to give any notice required under Subsection (1) and Subsection (2) of the Clause. That would put the matter beyond doubt.

Lieut.-Col. FREMANTLE said he had moved a former amendment seeking to establish the status of the medical superintendents by putting it clearly in writing that they should have definite authority to admit, discharge, etc., patients. That was refused by the Minister of Health because he said it must be left to the local authority. Surely the local authority who could give the necessary powers to their officials could presumably impose the necessary penalties? Why was it necessary to impose the penalties in the Bill and not trust the local authorities to deal with their own officers? Surely this was a retrogressive and inconsistent principle which had been too often adopted in respect of technical advisers. The reason probably was that this had always been done, and because it gave a feeling of security to the public. The medical superintendents themselves accepted that position, because public opinion was so timorous, but he hoped it would not be registered definitely that they were weighted down in that way.

Mr. GREENWOOD said local authorities did not feel insulted by this procedure, as it had been adopted before. Taking into consideration the number of private institutions quite clearly they ought to have some safeguard in the form of a penalty which would keep people up to their responsibilities.

Mr. KINLEY's amendment to delete the Subsection having been negatived, it was agreed, on the motion of Sir Boyd Merriman, to limit the penalty to failure to give notice required under Subsection (1) and Subsection (2) of the clause.

The clause as amended was added to the Bill.

Visitation of Voluntary Boarders.

On Clause 3, Mr. RICHARD RUSSELL moved, in Subsection (1), to leave out the words "at any time visit a person received as a voluntary boarder under Section 1 of this Act or under the provisions of any local Act," and to insert instead: "at the request of any person received as a voluntary boarder under Section 1 of this Act, or under the provisions of any local Act, visit such person." He said the patients who submitted themselves for voluntary treatment, when they entered an institution, might be inspected the day after by a lunacy Commissioner, who might immediately certify them under the principal Act. That would be a fatal thing to happen. Nothing more disastrous to voluntary treatment could happen in any district.

Mr. GREENWOOD said he could not accept the amendment as it was based on a misapprehension. The idea that the Board of Control went about certifying people was, of course, without any foundation. What was being asked for was that no voluntary boarder should ever be visited by the Board of Control, except at the patient's request. They were told that this was being done for the protection of the patient, but such a proposal might very well be detrimental to his interests. For the general protection of persons in this category it was essential to keep independent power of inspection by the Board of Control.

Sir BOYD MERRIMAN said the point of substance which he thought emerged from this discussion was whether there was any real safeguard in the Clause at all. If there were only to be five Commissioners would there ever be any real probability that Commissioners would visit voluntary patients with sufficient frequency to make their visits of any real effect for the purposes of the Bill? Though he quite understood that they could not possibly make it compulsory, the Committee would have very seriously to face later on whether there should not be more Commissioners so that visiting in this and other respects might be more effective.

Mr. GREENWOOD said it was true that there were five members of the Board, but it was part of the scheme to have a considerable staff of Visiting Commissioners. The actual visitation, therefore, was not confined to the Board of Control.

Lieut.-Col. FREMANTLE said the matter was not at all clear. It was true that Clause 11 provided for Commissioners other than the Board of Control. Those were the present Commissioners which composed the Board, 13 in number. He thought that there were to be nine of them left after this process of hari-kari, of whom five were to be members of the Board of Control, and the others senior Commissioners. Those who were being turned off the Board would be available to make visits, and he agreed that they needed people of that status for this purpose. But no provision was made in Clause 11 to replace the excellent men and women who were being turned off the Board of Control. When they died it was proposed that they should be replaced by assistant Commissioners and inspectors. He hoped that the Government would remedy this flaw in the Bill.

The amendment was negatived.

Clause 3 as amended was added to the Bill.

The Committee adjourned.

On Tuesday, March 11th, The Mental Treatment Bill was further considered by Standing Committee A of the House of Commons. Mr. Cecil Wilson was in the chair.

Power to Lodge Relatives and Friends of Boarders.

On Clause 4, Dr. VERNON DAVIES moved an amendment to provide that relatives or friends of patients might be lodged in any institution, or in any hospital, nursing home, or single care approved for this purpose by the Board of Control.

Miss SUSAN LAWRENCE (Parliamentary Secretary to the Ministry of Health) said that this clause was inserted in order to keep alive Clause 229 of the Lunacy Act. It was not desirable that this provision for lodging friends or relatives of patients should be extended to other institutions that registered hospitals or licensed houses. It had never been the practice to allocate accommodation which was reserved for patients in these other institutions, and the local authorities did not desire this extension. They did not want to make their asylums into great hotels.

Dr. MORRIS-JONES said he hoped the amendment would not be accepted. It might make it impossible to run the hospitals at all.

Dr. VERNON DAVIES pointed out that his amendment was permissive. It did not compel the proprietor of an institution to take in friends or relatives of patients if he had no room for them.

Replying to further questions, Miss SUSAN LAWRENCE explained that the clause as drafted did not include public institutions. It reproduced Clause 229 of the Lunacy Act in reference to licensed houses, and Section 230 as it had been interpreted in relation to registered hospitals. It also brought the law into conformity with the new provisions which dealt with three instead of two classes of patients.

The amendment was negatived.

Standard of Accommodation for Relations and Friends.

Lieut.-Col. FREMANTLE moved an amendment to enable friends or relatives to be lodged in accommodation which was of a lower standard than was required for the patients themselves. He said that a fairly high standard was required for patients, but there seemed no reason why other accommodation should not be used for patients' relatives.

Miss SUSAN LAWRENCE said that she hardly thought that the amendment was necessary. They must be strict in these matters, and they did not want boarders taken in beyond the number for which the house was licensed. The Royal Commission was divided on the question of licensed houses, and it was desired to leave them alone as far as possible.

Dr. MORRIS-JONES said that private licensed houses in this country could not extend the number of their beds beyond that allowed under the Lunacy Act of 1890. No proprietor of one of these houses would be likely to encourage friends or relatives to occupy the limited amount of accommodation which they had at their disposal.

Sir BOYD MERRIMAN said that he thought that the Parliamentary Secretary was treating the matter rather too lightly. It was not to be dismissed merely by saying that

they did not want to touch licensed houses in this Bill. It must be remembered that in the Bill they were creating a third and very important class of patient who would be allowed to go into licensed houses. That being so, it was very desirable to safeguard these licensed houses by this amendment. He hoped that the Parliamentary Secretary would reconsider the matter.

Miss SUSAN LAWRENCE said that every room which was suitable in these licensed houses was worth a great deal of money. If it was desired to receive relatives or friends of patients it had always been the practice that one of the beds licensed for patients could be diverted for that purpose. They did not give these people a hotel licence as well as an asylum licence. If that were done, it would not be conducive to the good conduct of these houses. It would make the business of running them much more profitable, and she did not think in view of the attitude of the Royal Commission that it was desirable to do anything to make these places more profitable. Many people desired that these licensed houses should be abolished altogether.

Lieut.-Col. FREMANTLE said that it was unworthy of the Parliamentary Secretary to suggest that because this proposal would make these licensed houses more profitable the Committee should vote against the amendment. This Bill created a wholly new class of patients for which increased accommodation would be required. It was no use passing Acts of Parliament like this unless they made proper provision for the treatment of the patients. Were they going to start enormous building schemes and spend millions of pounds? Or should they not rather make the most of the existing accommodation? (Cheers.) By taking away beds in licensed houses for the use of relatives and friends of patients they were actually diminishing the accommodation available for patients, and that accommodation, as had been pointed out, was strictly limited. It might well be that it would encourage these early cases to come in for treatment if they knew that some relative or friend could accompany them.

Mr. GREENWOOD, Minister of Health, said that he was prepared to see if words could be devised to meet the point raised by Col. Fremantle.

Lieut.-Col. FREMANTLE thanked the Minister and withdrew his amendment.

Clause 4 was added to the Bill.

Temporary Treatment Without Certification.

On Clause 5, Lieut.-Col. FREMANTLE moved an amendment to leave out the word "temporary." He said that that word was felt by his professional colleagues to be meaningless. There was no such thing as temporary treatment of these cases; the treatment must be final and permanent.

Mr. GREENWOOD said that the Committee had already accepted the words "temporary treatment" on Clause 2, and it would be a little awkward to go back on that decision now. He thought that the phrase met the case pretty well.

Dr. MORRIS-JONES said that he hoped that Lieut.-Colonel Fremantle would not press his amendment. The phrase "temporary treatment" did no harm, and was very encouraging.

Lieut.-Colonel FREMANTLE withdrew his amendment.

Sir BASIL PETO moved an amendment providing that temporary patients should not be received in any asylum, mental hospital, registered hospital, or licensed house.

Mr. GREENWOOD said that the effect of the amendment would be to take these temporary patients out of the institutions where many of them were receiving treatment at the present moment and leave them stranded. Between one-quarter and one-third of the patients in these institutions would, when the Bill became law, be treated as temporary patients, and he asked where were they to be treated, if they were turned out of the mental hospitals? The local authorities could not possibly be expected to provide special institutions for them, and the result would be to reduce the effect of this measure to nothing.

Sir BASIL PETO said that it would be far better to provide suitable accommodation for a few of these people rather than drive them into asylums and mental hospitals on the pretence that they were giving them remedial treatment.

Mr. GREENWOOD said that these people were not being driven into these hospitals. The Bill got rid of the stigma of certification so far as this class of patient was concerned. They were to-day being treated in these mental hospitals and every member of the House of Commons knew that the accommodation for this class of illness was insufficient. It was far better, for the time being at any rate, that these temporary patients should be treated in institutions which had been equipped for mental treatment and which were manned by people who understood mental disease. (Cheers.)

The amendment was negatived.

The Committee adjourned.

HOUSE OF LORDS.

TUESDAY, MARCH 4TH.

HOUSING AND SLUM CLEARANCE.

The debate was resumed on the motion of the Bishop of SOUTHWARK, that there should be laid before the House Papers with reference to recent annual reports of Medical Officers of Health on bad housing conditions.

Lord BUCKMASTER said that one thing that had struck him about that debate was that nobody had attempted to deny the existence and the extent and the gravity of the evil to which the Bishop of Southwark had called attention. Why did these things remain? He believed that the first reason was that nothing was easier than to bear the sorrows of other people when they were poured out upon one in the form of statistics. They lost all their reality. The first thing thought of in order to find a remedy was to call in national aid. But it always seemed to him that to call in State interference to remedy any mischief was very like asking someone to mend the delicate machinery of a watch with boxing gloves on his hands. It was the most impersonal, the most clumsy, and the most costly method ever conceived for removing any grievance, and he often wondered if noble Lords opposite, belonging to the Labour party, who, he believed, were pledged to this method of curing our evils, were not really like children who played at wolves in the wood, but would be terrified to death if the wolf ever came to life. The one thing that had to be recognised by anyone who was serious in this matter was the simple fact that it was absolutely impossible under present conditions to build houses, or to recondition rooms for people who lived in and came from the slums, and to let them at an economic rent. It must either be done by taxation or by voluntary aid, and to his mind voluntary aid was by far the most potent and important agency. They could by careful management so build and recondition houses that while on newly built houses they could get 2½ per cent. on their money, on reconditioned houses they could get 4 per cent. and perhaps 4½ per cent. The Government could raise money—if they disregarded altogether the question of income tax which they got back on it—at about 3½ per cent. On an average they got 1 per cent. or 1½ per cent. back on income tax. If, therefore, they gave carefully selected voluntary associations pound for pound for the money they raised or even two pounds for every pound they raised, and charged 2½ per cent. interest, they would only be 1 per cent. out of pocket. By that means they would be able to stimulate this work throughout the whole Metropolis, and he believed that the results would be very remarkable. The Bishop of Southwark had referred to a matter which touched this subject most intimately, namely, the question whether, if they expanded the accommodation for these people, and gave them larger and better houses for living in, their families would increase so that these difficulties would be revived. The Right Rev. Prelate had pointed out that that fortunately was not shown by experience; but there could be no doubt that the unchecked growth of our population was associated with the creation of slums, and having given the best of his thought to the matter he was quite satisfied that when either by social or scientific means they had discovered how to control posterity then, and not till then, would man be master of his fate. But that controversy was a wider one than this one, and he did not propose to revive it. It was impossible, however, to pass it by having regard to the fact that the Right Rev. Prelate, and many others, must have recognised that they could reduce almost everything to a state of squalor if they had more people in a house than people could afford to keep, or a woman had power and time to look after. The small holding of houses was not a good thing. People ought not to be encouraged to put their small savings into these small houses. It was by large holdings under intelligent supervision that these matters could be humanely met. He believed that a private effort assisted by State aid was the real way in which this matter could be dealt with. He thought they had to awaken a public opinion which would not rest satisfied merely by the belief that when with difficulty they had discharged the demands of the tax-gatherers, they had discharged all their duties to their fellow-men. He suggested that it might be possible for the trade unions affected to relax all their restrictive rules, except those relating to wages, in cases where men were engaged either in reconditioning or rebuilding such houses as were the subject of this debate.

The Housing Problem in Country Areas.

The Bishop of HEREFORD said in country areas housing presented in many ways as grave a problem as it did in the towns. Moreover, it was much more difficult in the country to rouse public opinion. One of the difficulties which presented itself in getting houses for men with low wages at an economic rent was the question of rates. There had

been a definite effort by some Corporations to meet this difficulty. Birmingham and Liverpool in particular had distinguished themselves by insisting on a low assessment of property which had been reconditioned or had been built to meet the needs of the slum dweller. These experiments might be extended, but they had been largely hampered by the Rating and Valuation Act, 1925. It had been said that national expenditure was going up by leaps and bounds. That was true, but surely a distinction must be drawn between productive and unproductive expenditure, and he wanted to ask their Lordships whether there was any more productive expenditure than that of the housing of the people?

Lord TEMPLEMORE said that slum clearance schemes were drawn up by the late Minister of Health, and were no doubt now available at the Ministry. He hoped the Government in dealing with the problem would make use of those schemes, which he was quite sure were very good and efficient ones.

The Earl of IVEAGH said that the gravity of the problem which faced them to-day was the result of the difficulties caused by rent restriction. It was impossible to get hold of large areas in order to reconstruct the houses on them, or even to build flats at a reasonable price, owing to the right which was given to tenants by the Rent Restriction Acts. Somebody had to pay for getting the present tenants out. There would be overcrowding until they gave a certain class of people the accommodation they wanted near the centre of things. Until the owners of land could more easily deal with their own property the further development of new buildings for the working classes would be delayed.

A Slum Clearance Bill.

After further debate,

Lord PARMOOR, Lord President of the Council, said it was certainly the intention of the Government to introduce a Slum Clearance Bill this Session, and to pass it into law. He did not doubt for a moment that the present Government would have the advantage of the researches made and the facts ascertained by the late Government. It would really be a sorry idea of public life in this country if they did not gratefully take advantage of what had already been done in this large and difficult question. It was true that the problem could not be solved unless the rural districts were considered as well as the slum areas in towns and industrial districts. It was intended to deal with the whole question of slum clearance both in the country and in the towns. It was a great encouragement to the Government to find that they were promised universal support in the task of putting an end to this great national evil. It was the hope of the Government to press on as quickly as possible with slum clearance, which in their view was an urgent necessity. Their object would be to secure that the new housing provision should be made available in advance of, and step by step with, the removal of slum properties. He did not shut his eyes to all the difficulties, but the Government believed that by a proper realisation of State obligations, and by urging on the local authorities to provide the necessary alternative accommodation, these great evils might at any rate to a great extent be mitigated.

The Bishop of SOUTHWARK, in withdrawing his motion for Papers, again pressed upon the Government the need for introducing their Slum Clearance Bill at the earliest possible moment.

HOUSE OF COMMONS.

MONDAY, MARCH 10TH.

Seven Years' Limit and Pension Claims.

Mr. WOMERSLEY asked the Minister of Pensions how many new pensions had been granted, and how many additional pension grants had been made, under the terms and conditions set out in the Circular No. 79 to the war pensions' committees, issued Dec. 6th, 1929, under the heading Applications for Pensions, in respect of disablement claimed more than seven years after discharge.—Mr. F. O. ROBERTS replied: It is not possible to distinguish the number of cases which have been dealt with specifically under the modified arrangements referred to, but I may say that 117 awards have during the last three months been made in respect of applications submitted more than seven years after the man's discharge and in addition, treatment has been provided in 14 cases.

Vaccination of School Children.

Mr. LEACH asked the President of the Board of Education whether he was aware that parents at Skelmersdale were complaining that their children in the elementary day schools had been vaccinated without their consent; and whether he would draw the attention of the Skelmersdale education authority to the illegality of this procedure.—Sir C. TREVELYAN replied: I am not aware of any complaints of this nature, but I am making inquiries and will communicate further with my hon. friend.

Feeding of School Children.

Mr. SORENSEN asked the President of the Board of Education how many local education authorities were providing meals for school children; approximately how many children were fed during the winter months; and the total cost.—Sir C. TREVELYAN replied: 142 local Education Authorities are at present providing meals for school children. During the last few months the number of children fed has varied from about 130,000 in Nov. 1929, to 157,000 in Feb. 1930. The net cost to the authorities in the year 1928–29 was about £227,000.

Opium Manufactured in India.

Mr. DAY asked the Secretary of State for India the amount of the various alkaloids of opium manufactured at the government's factory at Ghazipur during the 12 months ended to the last convenient date; the amount derived from the sale; and the countries to which it was generally exported.—Mr. WEDGWOOD BENN replied: In the 12 months ended September, 1928, 916 lbs. of alkaloids of opium were manufactured at Ghazipur. The proceeds of sales during that period were Rs.97,463. None was exported except to the United Kingdom, and since the period in question export has been suspended.

Cerebro-spinal Meningitis in the Navy.

Mr. FREEMAN asked the First Lord of the Admiralty whether an outbreak of cerebro-spinal meningitis occurred recently on H.M.S. *Wallace;* whether he would state the number of cases that occurred; the number of deaths; the vaccinal condition of each; and when vaccination had last been enforced.—Mr. AMMON (Parliamentary Secretary to the Admiralty) replied: I have no information of an outbreak of cerebro-spinal meningitis in H.M.S. *Wallace.* One case was reported on Jan. 27th last, who was remaining under treatment at the Military Hospital, Gibraltar, on Jan. 29th. This man was re-vaccinated on Sept. 1st, 1926.

Increase of Motor Accidents.

Mr. GOSSLING asked the Minister of Transport how many fatalities from motor-car traffic had occurred this year; whether his attention had been drawn to the increase in these accidents as shown by the complete figures for 1929; if he intended to investigate the relevance of the human factor in these statistics; whether he would inquire into the desirability of imposing upon drivers of motor-vehicles tests on the lines of those advocated by the experts of the National Institute of Industrial Psychology; and whether he was aware of the results, that have been achieved by the application of similar principles in the United States.—Mr. H. MORRISON replied: The figures for which my hon. friend asks are not yet available, but I am aware of the tendency of motor accidents to increase in number. It is my intention if the Road Traffic Bill becomes law to utilise the powers which it would confer on me in order to investigate and analyse the causes of motor accidents. At present I am not convinced that any substantial proportion of the accidents in this country are due to deficiencies on the part of drivers which would be disclosed by any form of test.

Experiments on Animals.

Mr. FREEMAN asked the Home Secretary whether the Mount Vernon Hospital, Northwood, Middlesex, was a registered place under the Cruelty to Animals Act of 1876; if so, at what date this registration was first granted; and how many licences and certificates under this Act were granted in 1929 for the performance of experiments on animals at this hospital.—Mr. SHORT (Under Secretary to the Home Office) replied: The place in question was registered on Feb. 26th. One licence with Certificate A is available there.

Panel Practitioners and Excessive Prescribing.

Dr. LITTLE asked the Minister of Health if his attention had been drawn to the case of a partnership of four doctors practising in the East End who had been fined £100 by the London Insurance Committee for the offence of excessive prescribing; and if he would in the circumstances mitigate or remit this fine.—Mr. GREENWOOD replied: I am aware of this case. The Insurance Committee have made a recommendation, but for the reason given in reply to a similar question on Feb. 27th, I cannot undertake to anticipate the decision at which it will be my duty to arrive.

Certified and Grade A (T.T.) Milk.

Dr. VERNON DAVIES asked the Minister of Health (1) if producers of certified and Grade A (T.T.) milk were judged

by the milk produced or by the condition of the cow; and if this product continued to conform to the required standard, why had he issued an order restricting the movement of such animals if the owners, knowing their responsibilities, wished to do so; and (2) if the Minister had any evidence proving that cows exhibited at agricultural shows had become affected with tubercle at such shows; and if so, if he would lay such evidence before the House in a White Paper.—Miss SUSAN LAWRENCE (Parliamentary Secretary to the Ministry of Health) replied: The only satisfactory test for tubercle bacillus in milk is one which takes several weeks to carry out, and it is therefore necessary, in order to obtain the maximum possible safeguard against the presence of tuberculosis in the milk in question, to lay down conditions as to the testing of the cattle and their isolation from untested animals. When a cow is found to be tuberculous it is rarely possible to determine how she has become infected, but my right hon. friend is advised that the association of tested with untested animals at a show involves a risk of infection which he would not be justified in taking in the interests of the consumers to whom he is, in effect, guaranteeing the milk as being of the highest possible purity.

Paupers and Vaccination.

Mr. CARTER asked the Minister of Health whether he was aware that on Feb. 20th over 400 pauper inmates of the St. Pancras workhouse were vaccinated without being asked for their consent; that the majority of these people believed that the reason for stripping to the waist was for examination purposes only and had no idea that it was for vaccination until they were actually vaccinated; that the few men who successfully resisted this attempt to vaccinate them had their leave stopped; that no objection was raised to the men taking their discharge but only to their having leave; that Mr. L. L. Ross left the house on Feb. 22nd and returned at 7 P.M. with a new order of admission, and was told at the receiving ward that he must either agree to be vaccinated or go outside; that he refused to be vaccinated and demanded an order from the master in writing that vaccination was compulsory before he would agree to leave; that after an interview with the Assistant Master Ross was admitted 50 minutes after his arrival; that two men were refused admission on Feb. 21st at 5.30 P.M. after presenting their orders; and whether he would point out to the St. Pancras workhouse authorities that they had no right to make vaccination a condition of admission to the workhouse.—Mr. GREENWOOD replied: On Feb. 20th a male inmate was found to have been suffering from small-pox for three or four days and since he had been in contact freely with other inmates it was considered advisable to examine medically all the men in the institution. Opportunity was taken of advising the men to be vaccinated, but it was made clear that any who objected were at liberty to refuse. A number of men in fact refused, but no leave has been stopped on this account. As regards Mr. Ross, the facts are substantially as stated; the delay in readmitting him was due to a misunderstanding which was rectified as soon as it was brought to the notice of the Assistant Master, and steps have been taken to prevent a recurrence of the difficulty. There is no record of two men being refused admission on Feb. 21st. The duty of a poor-law authority to relieve destitution would not be affected by a refusal of the applicant to be vaccinated, but in certain circumstances it might be quite proper that relief should not be given in a particular institution.

Patients' Comfort in Poor Law Hospitals.

Dr. HASTINGS asked the Minister of Health whether he would take steps, in the case of Poor Law hospitals, to stop the practice of awaking patients at five o'clock in the morning for the purpose of ablutions, when these could be carried out at a more reasonable hour without interfering with their sleep.—Mr. GREENWOOD replied: I am anxious that everything possible should be done to study the comfort of patients and this matter is one which is constantly under consideration. I have been interested to see the steps proposed in this regard in the important hospital with which my hon. friend is connected, but as he will appreciate the subject is one in which it is difficult to make general recomdations.

Local Authorities and Birth Control.

Mr. THURTLE asked the Minister of Health the names of the 65 or more local authorities who had sent resolutions to his department in favour of local authorities being permitted to give birth-control information to married women who desired it.—Mr. GREENWOOD replied: I am sending the list to my hon. friend.

Silicosis.

Mr. RENNIE SMITH asked the Home Secretary if, following the recent Report on the conditions of silicosis, further legislation was being prepared, and when the Bill would be presented to the House.—Mr. CLYNES replied: Yes, Sir. A Bill is being prepared and while I cannot pledge the Government I hope that it may be presented to Parliament before the end of the present month.

Mr. RENNIE SMITH asked the Home Secretary if he could give particulars of the committee appointed by the Medical Research Council further to investigate pulmonary silicosis, and other pulmonary conditions arising from industrial processes; and if he could indicate the scope of the inquiry.—Mr. CLYNES replied: The appointment of this Committee and the scope of their inquiry were announced in the Press of Feb. 22nd. The Committee will advise on the further investigation of pulmonary silicosis and of other pulmonary conditions associated with the inhalation of dusts arising from industrial processes. It will be their duty to survey the whole field and to advise the Council on new lines of inquiry that may be profitably pursued, and they will assist in the supervision of such investigations as it may be decided to initiate or support. The work will be directed particularly towards obtaining, in coöperation with the Factory Department, more accurate knowledge of the causes and diagnosis of silicosis and of other industrial pulmonary disorders.

Supply of Radium.

Lieut.-Commander KENWORTHY asked the Minister of Health whether any progress had been made in obtaining supplies of radium independently of the present foreign monopoly, and especially from mines and workings within the Empire; and what steps were being taken to this end.—Mr. GREENWOOD replied: The primary objective is to increase the amount of radium at present available for use in this country and the Radium Trust has thought it best with that object to have recourse to the existing sources of supply, including such supply as is available in this country.

Approved Societies' Reserve Funds.

Dr. MORRIS-JONES asked the Minister of Health the total amount of reserve funds possessed by approved societies under the National Health Insurance Acts as at Dec. 31st, 1929.—Mr. GREENWOOD replied: The total amount of funds of approved societies under the National Health Insurance Acts in Great Britain at the latest date for which particulars are available, viz., Dec. 31st, 1928, was in round figures as follows:—

1. Sums standing to the credit of approved societies in the National Health Insurance Funds, including amounts in the Investment Account	£59,000,000
2. Sums invested by or on behalf of approved societies	55,000,000
3. Cash in hands of approved societies	1,500,000
Total	£115,500,000

Apart from the foregoing, there are also certain book credits called reserve values, created under those provisions of the original National Insurance Act, and subsequent enactments, which are now embodied in Section 66 of the National Health Insurance Act, 1924. These book credits will in due course be converted into cash by the operation of the sinking fund set up for the purpose. (See Section 67 of the National Health Insurance Act, 1924.) The amount of reserve values credited to approved societies in Great Britain and outstanding at Dec. 31st, 1928, was in round figures £47,500,000.

Sale of Reconstituted Milk.

Mr. EVERARD asked the Minister of Health, whether he was aware that at a recent food and cookery exhibition at Olympia, London, reconstituted milk was supplied to members of the public, and that a firm of manufacturers of emulsifying machines had advertised the claim that milk and cream made on their stand was supplied to all the demonstration and competition theatres at that exhibition; and whether, in view of the extended sale of emulsifying machines, he would take prompt steps to remind all food and drugs authorities that the sale of reconstituted milk was illegal.—Mr. GREENWOOD replied: I have received information to the effect of the first part of the question. The Food and Drugs Authorities are already aware of the statutory provision prohibiting the sale of reconstituted milk as milk, and on the information at present before me I do not think it necessary to address any special communication to them on the subject.

Factory Inspectorate.

Mr. KELLY asked the Home Secretary whether there had been any increase in the number of factory inspectors during the last year; and whether any further increase was proposed.—Mr. CLYNES replied: No addition was made last year to the total strength of the inspecting staff. As regards the future, my hon. friend will no doubt have seen the announcement in the newspapers of the important changes which the Government have decided to make in the strength and organisation of the Factory Inspectorate. These

include increases (to be spread over a period of five years) both in the general inspection staff and in the technical branches (medical, engineering and electrical). The general inspection staff attached to the inspection Divisions and Districts will be raised in number from 180 to 243. The technical branches will also be substantially increased, the medical staff from 5 to 8; the electrical staff from 5 to 12; and the engineering staff from 6 to 10. During the year 1930–31 it is proposed to appoint 15 additional inspectors to the divisional and district staff, making, with seven vacancies in the existing inspectorate, a total of 22 new inspectors to be appointed this year. In the technical branches two medical, two engineering and four electrical inspectors will be added.

TUESDAY, MARCH 11TH.

Doctors and Excessive Prescribing.

Mr. SORENSEN asked the Minister of Health whether he was aware that penalties were imposed on doctors recently for excessive prescribing; whether he was aware of the dissatisfaction that existed at this limitation of the purpose of health insurance; and whether he intended to take action that would remedy the situation.—Miss LAWRENCE replied: My right hon. friend gathers from the terms of my hon. friend's question that he is not aware that power to withhold remuneration from insurance doctors on account of excessive prescribing has existed and has been exercised since medical benefit first came into operation in 1913. No limitation of the scope of medical benefit is involved, and the answer to the third part of the question is therefore in the negative.

Sickness and Disablement Benefits.

Mr. RHYS DAVIES asked the Minister of Health if his attention had been called to the distress caused among those insured persons whose disablement benefit had recently been reduced under the provisions of the National Health Insurance Act, 1928; and, if so, if he would inquire into the matter with a view, if possible, to a return to the status quo in this connexion; and if he could state approximately the number of insured persons whose disablement benefit had recently been reduced consequent upon the operations of the provisions of the National Health Insurance Act, 1928.—Miss LAWRENCE (Parliamentary Secretary to the Ministry of Health) replied: My right hon. friend is aware that there has been some misapprehension with regard to the reduction in the standard rates of sickness and disablement benefits payable to insured persons after the lapse of a long period without the payment of any contributions. No statistics are available as to the number of persons who are subject to such reduction, but as the payment of a single contribution for any week after June, 1928, would have been sufficient to prevent the reduction, my right hon. friend does not think that there can be many cases of the kind. The great majority of such cases would be those of persons who have paid no contributions for many years and who would, but for a special regulation which my right hon. friend recently made, have ceased to be insured and entitled to any benefits at the end of 1929. My right hon. friend is afraid that it would be very difficult to justify any further concession to these people at the cost of the benefit funds of approved societies.

Industrial Health Research Board.

Mr. MANDER asked the Secretary of State for War if he could give the results of the work carried out at the Beachley Technical School on behalf of the Industrial Health Research Board by the National Institute of Industrial Psychology in connexion with the War Office; and if he proposed to develop the matter further.—Mr. T. SHAW replied: Investigations have been undertaken with the assistance of the National Institute of Industrial Psychology to see what would be the best method of allocating to a trade boys entering the Army Technical School (Boys) at Chepstow and elsewhere as apprentice tradesmen. These investigations are still proceeding.

AN ENLARGED COTTAGE HOSPITAL.—Neston (Cheshire) and District War Memorial Cottage Hospital has been enlarged by the building of two new wards and other additions, which were recently opened by Lady Leverhulme.

MEMORIAL TO LORD HAMBLEDEN.—A bust of the late Lord Hambleden has been erected in the north-east corner of Lincoln's Inn-fields. He was for 14 years vice-chairman and for 20 years chairman of King's College Hospital, for nine years chairman of the British Hospitals Association, and one of the founders and chairman of the Hospital Saving Association.

Obituary.

HORACE STANSFIELD COLLIER, F.R.C.S.,

LATE SURGEON TO ST. MARY'S HOSPITAL.

WE regret to announce the death of Mr. Stansfield Collier, which occurred at Teynham, Kent, on Feb. 26th, after prolonged illness.

Horace Stansfield Collier was the elder son of Dr. Alfred H. Collier of Cranford, and received his medical education at St. Mary's Hospital, taking the double English qualifications in 1888, and proceeding to the F.R.C.S. in 1890. At the hospital he held the usual junior appointments, and in 1897 was elected assistant surgeon. Previous to that appointment he had been a resident at the London Fever Hospital, demonstrator of anatomy at St. Mary's Hospital, and assistant surgeon to Paddington Green Children's Hospital, while in 1898 he was elected surgeon to the Great Ormond-street Children's Hospital. The direction of his clinical work and surgical interests was early indicated, and during the whole of his long connexion with St. Mary's Hospital and with Great Ormond-street he preserved the same attachment to surgical pædiatrics.

We owe the following estimate of Stansfield Collier as colleague and teacher to Sir William Willcox:—

Horace Stansfield Collier will be remembered with affection and gratitude by many of his contemporaries at St. Mary's Hospital, and at the Hospital for Sick Children, Great Ormond-street. He was a student of St. Mary's Hospital, and, before qualifying, decided upon surgery for his future career. The enthusiasm and energy displayed in his work were remarkable, and it is feared were the cause of his early breakdown in health at a time when he had risen to a high position in the surgical world of this country. He was demonstrator of anatomy at St. Mary's Hospital from 1894 to 1898, and surgical tutor from 1897 to 1902. In 1897 he was elected to the staff of St. Mary's Hospital as assistant surgeon, and, shortly after this, was appointed to the surgical staff of the Great Ormond-street Hospital. He did a colossal amount of surgery during the period 1897–1911 and completely overtaxed a constitution that was none too strong. His health gave way in 1911, so as to necessitate his retirement from hospital practice.

Stansfield Collier was a man of lovable disposition and attractive personality. He gathered round him a host of friends amongst his colleagues, his students and the practitioners with whom he became associated. His generous disposition always made him thoughtful of the future careers of those junior to him, whatever their professional bent, and he spared no effort to encourage them in their early struggles. He was an able and attractive teacher, and was held in the highest esteem by the large number of students who attended his lectures and tutorial classes in surgery. There are many occupying high positions in the medical profession to-day whose successful careers were largely due to the helping hand extended to them by Stansfield Collier. As a surgeon the brilliancy of his diagnosis and operative skill soon made him known far outside the confines of the hospitals with which he was associated and he speedily acquired a very large practice; indeed his services became in great demand all over England, for he was seen to be a man of great originality, both in operative technique and in scientific after-treatment of cases. As, however desperate the situation might be, he never gave up hope, on many occasions remarkable recoveries resulted in apparently hopeless cases under his care. One example may be mentioned—a gymnastic instructor in the army fell in the course of his exercises and fractured the sixth and seventh cervical vertebræ. He lay completely paralysed for some months. Collier performed laminectomy, removed the broken fragments of bone pressing on the cord, and the patient made a complete recovery,

and afterwards became the faithful chauffeur to his surgeon until his retirement from practice.

Mr. Stansfield Collier married in 1894 Margaret, daughter of the late Robert Young of Clontarf, who survives him, but they had no family. Apart from his professional work and from his boyhood, his prevailing interest was centred in horses—riding, hunting and horse-breeding.

GEORGE MURPHY, M.R.C.S. ENG.

Dr. George Murphy, who died at the age of 80, was the oldest member of the medical profession in Carlisle, and was closely associated with the Cumberland Infirmary almost from boyhood. The son of a medical man, he qualified in 1873 as M.R.C.S. Eng., and took the diploma of L.R.C.P. Edin. in the following year, after completing his medical studies at Queen's College, Birmingham. For a time he assisted in general practice at Wednesbury near Birmingham, but afterwards he returned to his native city of Carlisle, where he soon developed a large practice. For many years he was medical officer for the Stanwix district of the Carlisle Union and Public Vaccination Officer. Dr. Murphy retired from active work about five years ago.

ANN LOW HORNE, L.R.C.P. & S. EDIN., L.R.F.P.S. GLASG.

Mrs. Horne, who died at Eday, Orkney, on Feb. 11th, had given her life to medical service in the islands. Ann Low Venters, as she then was, studied at the Women's Medical College, Edinburgh, qualifying in 1902, and settling two or three years later in Orkney, where she was medical officer to Eday and Pharay parishes. Although after her marriage with Mr. Charles Horne, of Skaill in Eday, she gave up formal practice she was often called upon to do the work of the parish when no other doctor was available. Whatever the rigours of the winter, whatever the distance, and however rough the road, she was always ready to answer the call of emergency, and her colleague, Dr. James Wilson, who sends us the information, writes that "she had the true spirit of the healer, and never once studied her own comfort or convenience. Of her we may truly say that she was an honour to her profession." Her death occurred after an hour's illness from repeated attacks of angina pectoris.

MEDICINE AND THE LAW.

Doctor's Right to Choose his Patients.

MEMBERS of the public sometimes complain that a medical practitioner has omitted to attend on request. As the coroner observed in a recent inquest at Aldershot, a doctor is not obliged to attend a case if he does not want to; he can be criticised if he promises to attend and then fails to do so, but he is perfectly entitled—like any other professional man—to say he cannot attend to a case. The circumstances disclosed at the inquest were perhaps exceptional. On Wednesday, Feb. 19th, the wife of a private in the Army gave birth to twin children, one of which died. She had been taken ill with measles on the previous Monday—a fact which probably brought on premature birth. The husband stated that he called in a doctor on the Monday, who attended and advised him to call in an Army doctor. The Army doctor saw his wife the same day and said that, as it was a case of measles, he could not admit her to the Louise Margaret Hospital; he suggested that the husband should try to arrange for her to have a nurse at home or to go to the infirmary. Early on the Tuesday, when his wife was taken ill, he called at the surgery of a partnership of local doctors and left a message that the panel doctor should call. He had not, however, ascertained who his wife's panel doctor was, owing to his papers coming to him from Dublin. No doctor, in fact, came, and, when his sister went again to the surgery in the evening, the doctor, it was said, refused to come. He went himself to the surgery on the Wednesday morning when one of the doctors there said he could not attend. He also described his difficulties in obtaining a nurse. "I think," he stated at the inquest, "that either one of the doctors should have come; I didn't want them to come for nothing; when you go for a doctor, I think he should come to see the person, and that it is his place to do such a thing, but they refused absolutely to come, and almost closed the door in my face, and I was left there not knowing what to do." The coroner said he did not want to criticise the father who had had a worrying time, but the State provided all sorts of assistance, and the father did not even take the trouble to find out who was his wife's panel doctor. The coroner did not think any blame could be put upon the doctors at the surgery. The cause of the whole trouble was the measles, but for which the mother would have been treated at the Louise Margaret Hospital. A verdict was returned that the death was due to premature birth.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 1ST, 1930.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 439 (last week 376); scarlet fever, 2618; diphtheria, 1732; enteric fever, 37; pneumonia, 1719; puerperal fever, 56; puerperal pyrexia, 143; cerebro-spinal fever, 11; acute poliomyelitis, 9; encephalitis lethargica, 22; dysentery, 3; ophthalmia neonatorum, 105. No case of cholera, plague, or typhus fever was notified during the week.

Of the 439 cases of small-pox, 183 were reported from the county of London, distributed as follows among the various boroughs: Battersea 2, Bermondsey 1, Bethnal Green 18, Camberwell 4, Deptford 4, Finsbury 9, Hackney 10, Islington 16, Kensington 1, Poplar 32, St. Pancras 12, Shoreditch 45, Southwark 1, Stepney 25, Stoke Newington 3; and from the Home Counties: Essex 39 (including West Ham 12, Leyton 11), Kent 27 (all in Bromley), Middlesex 4 (Enfield 1, Hendon 2, Tottenham 1), Surrey 1 (Epsom R.D.).

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on March 4th–5th was as follows: Small-pox, 602 under treatment, 23 under observation (last week 621 and 18 respectively); scarlet fever, 2198, diphtheria, 2789; enteric fever, 11; measles, 1052; whooping-cough, 98; puerperal fever, 25 (plus 15 babies); encephalitis lethargica, 122; poliomyelitis, 1; "other diseases," 15. At St. Margaret's Hospital there were 12 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there were 4 deaths from small-pox, 2 (0) from enteric fever, 143 (51) from measles, 14 (4) from scarlet fever, 35 (3) from whooping-cough, 52 (14) from diphtheria, 68 (20) from diarrhœa and enteritis under two years, and 102 (16) from influenza. The figures in parentheses are those for London itself.

The four cases in which small-pox was mentioned as a cause of death were assigned to Bethnal Green (Met. Borough) 2, to Poplar (Met. Borough) and Enfield U.D. 1 each. The fatal cases of enteric fever outside London occurred in Salford and Wakefield. Fatal cases of measles were concentrated at Portsmouth 20, Manchester 10, West Ham and Wigan each 9, Sheffield 7, Walthamstow and Blackburn each 5. (Glasgow also reported 16 deaths.) Whooping-cough claimed 6 victims each at Birmingham and Manchester. Liverpool recorded 5 deaths from diphtheria, no other large town more than 2. Manchester reported 7 deaths from diarrhœa, Liverpool 5, and Birmingham 4. The deaths attributed to influenza were widely scattered, the highest figures being Manchester 9, Birmingham 6, Liverpool 4.

The number of stillbirths notified during the week was

298 (corresponding to a rate of 44 per 1000 births), including 47 in London.

Fatal Cases of Small-pox.

The fatal case of small-pox which occurred in the urban district of Enfield was that of a female, aged 70 years, who was taken ill on Feb. 15th with pain in the back. She had visited on Jan. 28th the fatal case of small-pox reported in our issue of March 1st (p. 480). Dr. D. H. Geffen, medical officer of health, was called in on Feb. 19th, when a diagnosis of small-pox was made. The patient died on Feb. 27th. She had been vaccinated in childhood.

The death in Poplar was that of a female, aged 45 years, who died at Joyce Green Hospital on Feb. 24th. Dr. W. Allan Young, medical officer of health, tells us that the death certificate was filled up thus: 1. (*a*) Mitral stenosis. (*b*) Pleurisy, pneumonia. 2. Small-pox. No P.M.

The two deaths in Bethnal Green were: (1) Female, 11 years. The cause of death was certified as pyæmia, small-pox (discrete modified). Dr. Vynne Borland informs us that there were no clinical symptoms other than small-pox when the patient was removed to hospital. (2) Female, 18 days. The cause of death was certified as small-pox, prematurity, jaundice. Dr. Borland adds: This baby was born on Feb. 11th, gestation about 8 months 2 weeks.

Medical News.

UNIVERSITY OF CAMBRIDGE.—On March 8th the following degrees were conferred:—

M.B. and B.Chir.—C. L. Owen, J. R. S. Webb, and C. G. Windsor.

M.B.—G. W. Pickering.

B.Chir.—C. F. Brockington.

MEDICO-LEGAL SOCIETY.—An ordinary meeting of this society will be held at 11, Chandos-street, Cavendish-square, W., on Thursday, March 27th, 1930, at 8.30 P.M., when a paper will be read by Prof. J. S. Haldane on Carbon Monoxide Poisoning and Its Medico-Legal Aspects, which will be followed by a discussion.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.—A meeting of the Maternity and Child Welfare Group will be held at 1, Upper Montague-street, W.C., on Friday, March 28th, at 8.30 P.M., when Dr. Hamilton Pearson will read a paper on Fits in Children.

IRISH MEDICAL SCHOOLS' AND GRADUATES' ASSOCIATION.—The annual dinner of this Association will be held on Monday, March 17th, at the Savoy Hotel, London, the President of the Association, Dr. W. P. Kennedy, being in the chair, and Mr. Cecil Harmsworth the principal guest. The hon. secretary is Mr. James Carver, St. George's in the East Hospital, E. 1.

LEAGUE OF ROSES.—In distributing badges to members of this League last week Princess Helena Victoria stated that since the League was established in 1910 it had collected £26,276 for the Royal Northern Hospital, £1556 of which was contributed last year. Since 1913 the hospital's out-patients have increased from 80,000 to 264,000 and the in-patients from 2371 to 5726.

ALBERT AND VICTORIA HOSPITAL AID SOCIETY.—At a dinner in aid of the funds of this society last week it was stated that since its formation 66 years ago it has helped hospitals, dispensaries, and other institutions in and around London to the extent of £50,000 and has distributed more than 160,000 letters to the sick poor of the capital. During last year 73 small suburban hospitals have been helped by the society.

THE KING GEORGE HOSPITAL, ILFORD.—A charter of incorporation has been granted to this great new hospital which is to serve Ilford, Barking, Dagenham, and the district, and is to take the place of the present Ilford Emergency Hospital, which has become entirely inadequate to the needs of a vast and rapidly growing population.

KING EDWARD'S HOSPITAL FUND.—Hospitals within 11 miles of St. Paul's Cathedral, which wish to participate in the grants made by King Edward's Hospital Fund for London for the year 1930, must apply before March 31st to the hon. secretaries at 7, Walbrook, E.C.4 (G.P.O. Box 465A). Applications will also be considered from convalescent homes which are situated within this area or which take a large proportion of patients from London.

Dr. N. J. L. Margetson (Medical Officer, District No. 1, Montserrat) has been appointed an official member of the executive council of the Presidency of Montserrat.

PANHELLENIC HEALTH EXHIBITION.—This exhibition, which we announced on p. 383 of our issue of Feb. 15th, has been postponed indefinitely owing to difficulty in finding suitable premises.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.—As a result of the terminal examination of the Division of Tropical Medicine and Hygiene, Dr. W. C. Davidson has been awarded the Duncan medal.

GENERAL LYING-IN HOSPITAL.—The seventeenth annual post-graduate week will be held at this hospital from May 5th to 10th. Particulars may be had from the secretary for post-graduate week at the hospital, York-road, S.E. 1.

ROYAL MEDICAL BENEVOLENT FUND.—The ninety-fourth annual report of this Fund was presented at the annual meeting on March 10th. Subscriptions and donations to the grant department amounted last year to £9231, as compared with £8623 in 1928, and 541 new subscribers were secured. A total of 416 grants were voted, and £8639 was distributed. Among legacies received was one of £17,274 from Dr. Alexander Lawrence.

SHEFFIELD AMBULANCE SERVICE.—The annual report of the ambulance committee of the Sheffield Joint Hospitals Council shows that last year more than 31,000 patients were carried 134,000 miles. Nearly 10,000 were in-patients at the hospitals.

LIVERPOOL WOMEN'S HOSPITAL.—The Liverpool Hospital for Women and the Samaritan Hospital are to be housed together in a new building. The 60 beds of the former were continuously occupied last year, 1277 in-patients having been treated. Voluntary contributions from patients amounted to £1859.

NORTH MIDDLESEX HOSPITAL.—A new department for the treatment of cancer by radium will be opened at this hospital on Tuesday, March 18th, at 2.30 P.M., by the Minister of Health, who will also lay the foundation-stone of an extension to the nurses' home.

ENLARGEMENT OF FINCHLEY HOSPITAL.—This institution is to be enlarged by the addition of 25 beds and the provision of better staff and administrative accommodation, at a cost of £30,000, towards which the honorary medical staff have contributed £100. The hospital has never been in debt.

HOSPITAL TREATMENT FOR MOTOR CYCLISTS.—The Yorkshire Centre of the Auto-Cycle Union has adopted a scheme whereby the members of the affiliated clubs will be insured in respect of hospital treatment in the event of their being injured while motoring, except in racing or speed trials.

WORK OF SUNDERLAND INFIRMARY.—The annual report of this institution shows that last year's work made a record. In-patients increased by 10, and out-patients by 4½ per cent., and there remained a waiting-list of about 600. Practically half of the list consisted of ear, nose, and throat cases, and six additional beds in a special ward are being set apart for these cases. The surgical work is increasing at the rate of 10 per cent. per annum. Extensions are in progress.

WASHING FACILITIES IN BAKEHOUSES.—A prosecution at Brighton on March 7th called attention to the Home Office Order dealing with washing facilities in bakehouses. To reduce the incidence of the form of dermatitis known as bakers' itch, the Home Office made the Order so that employees could wash their hands and arms instead of scrapping off the dough before it became dry. The firm which was summoned had provided washing facilities, but these did not come up to the standard laid down by law. After the visit of the factory inspector, however, the Order was complied with, and in the circumstances the Superintendent Inspector of Factories said he was prepared to withdraw the case on payment of costs. He emphasised that should it be necessary to bring any further cases, he would not be justified in repeating his line of action. It was stated by a member of the defendant firm that the men at the particular bakery did not handle any dough, and that during the last 20 years there had not been a single case of illness or disease caused through the bakery. The justices dismissed the summons on payment of costs, and the chairman pointed out that in the interests of public health there should be every facility to ensure cleanliness in the making of bread. Without such prosecutions as these many highly important Orders and regulations would simply remain dormant.

WOLVERHAMPTON EYE INFIRMARY.—All the figures for last year's work show an increase. The new patients totalled 14,230. There were 7030 accident cases, as against 4580 ten years ago. A new ultra-violet ray department has been provided.

RADIUM THERAPY IN CANCER.—Dr. J. Murdoch, Chief Medical Officer of the Department of Radiology and Radium Therapy at the Brugmann Hospital, Brussels, will lecture on this subject at the University of Sheffield on Tuesday, May 6th. This will be the third of a series of lectures arranged by the University in coöperation with the Yorkshire branch of the British Empire Cancer Campaign. It will be open to all medical practitioners, but those who wish to come from outside areas are asked to send their names to the secretary of the Clinical Studies Committee of the University.

LONDON SCHOOL OF MEDICINE FOR WOMEN.—On Friday evening, March 7th, Lady Barrett held a reception at the London School of Medicine for Women in Hunter-street, W.C., to welcome Dame Janet Campbell on her return from Australia. A large number of guests joined in the welcome, and took an opportunity of inspecting the medical school, where various popular exhibits were put out. During the evening Prof. Ainsworth Davis demonstrated a film showing the growth of tissues to big audiences, while an interesting musical programme was rendered by Mr. Hugh Mackay, Mr. Phelps, and Miss Sheelah Field. Mr. Mackay sang old ballads, traditional in Scottish villages, and illustrative of legend, scenery, and especially farm labour; these were well suited in their accompaniments, Miss Field as harpist being very successful.

PUBLIC ASSISTANCE HOSPITAL ARRANGEMENTS.—At Darlington the two senior women members of the Board of Guardians have been coöpted as members of the Public Assistance Committee, which otherwise consists entirely of members of the Town Council. Feetham's Infirmary is to be renamed "Darlington Municipal Hospital."—In January the Wiltshire County Council found that there were 350 empty beds in various public institutions in the county, and it is proposed to obtain space for mental defectives and increased hospital accommodation by rearranging the uses to which these institutions have been put.—At Newcastle-on-Tyne it is proposed to transfer tuberculous patients from Wingrove Hospital to the phthisis pavilions at Walker-gate Isolation Hospital or to Barrasford Sanatorium. Mental defectives will probably be removed from Wingrove to Shotley Bridge Colony when they are certified as suitable for treatment in that manner.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, March 18th.—5.30 P.M., Ballot for election to the Fellowship. 8 P.M., PATHOLOGY. Election of Officers and Council. Communications: W. W. C. Topley: Antibodies in Rabbits. Joan Taylor and H. D. Wright: Hæmolytic Streptococci in the Normal Vagina. G. R. Cameron and B. T. Mayes: The Effect of Tying the Hepatic Artery. Demonstration: J. W. Orr: Primary Carcinoma of the Liver in a Case of Hæmochromatosis.
THURSDAY.—5 P.M., DERMATOLOGY and MEDICINE (Cases at 4 P.M.). Special Discussion on The Therapeutic Value of Gold Compounds, Sanocrysin, &c. Openers: Prof. Lyle Cummins and Dr. A. C. Roxburgh.
FRIDAY.—5 P.M., BALNEOLOGY and CLIMATOLOGY. Discussion on The Influence of Sunlight and Other Climatic Factors in Health and Rheumatic Diseases. Opener: Dr. Charles W. Buckley. 8 P.M., OBSTETRICS and GYNÆCOLOGY. Short Communication: Dr. J. Estcourt Hughes: A Case of Hydatidiform Mole with Multiple Syncytial Infarction of the Lungs. Papers: Dr. Arthur E. Giles: The Influence of Hysteropexy on Subsequent Pregnancy and of Pregnancy on a Previous Hysteropexy. Prof. W. Fletcher Shaw: The Treatment of Prolapsus Uteri. 8.30 P.M., ELECTRO-THERAPEUTICS. Paper: Dr. J. M. Woodburn Morison: Diaphragmatic Hernia.

ROYAL INSTITUTION, 21, Albemarle-street, W.
TUESDAY, March 18th.—5.15 P.M., Dr. Charles Singer: Science of the Renaissance.
THURSDAY.—5.15 P.M., Mr. J. B. S. Haldane: Some Problems of Genetics.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.
THURSDAY, March 20th.—8.15 P.M. (at the Royal Army Medical College, Grosvenor-road, Millbank), the following amongst others will give Demonstrations: Dr. S. Adler, Sir Aldo Castellani, Colonel A. C. H. Gray, Dr. C. A. Hoare, Lieut.-Colonel S. P. James, Dr. William James, Mr. C. MacHattie and Major C. R. Chadwick, Mr. J. F. Marshall.

LONDON CLINICAL SOCIETY.
TUESDAY, March 18th.—8.30 P.M. (at the London Temperance Hospital), Clinical Evening. Cases.

CHELSEA CLINICAL SOCIETY.
TUESDAY, March 18th.—8.30 P.M., Dinner at the Hotel Rembrandt, Thurloe-place, S.W., followed by a discussion on Micturition. Openers: Mr. J. Everidge and Sir Thomas Carey Evans.

ROYAL MICROSCOPICAL SOCIETY, 20, Hanover-square, W.
WEDNESDAY, March 19th.—7.30 P.M., Mr. Joseph E. Barnard, F.R.S.: Presidential Address on Resolution and Visibility in Medical Microscopy.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.
TUESDAY, March 18th.—5 P.M., Dr. Donald Hunter: The Significance to Clinical Medicine of Studies in Calcium and Phosphorus Metabolism. (Last Goulstonian Lecture).
THURSDAY.—5 P.M., Dr. Carey F. Coombs: Syphilis of the Heart and Great Vessels. (First Lumleian Lecture.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, March 17th to SATURDAY, March 22nd.—MEDICAL SOCIETY LECTURE ROOM, 11, Chandos-street, Cavendish-square, W. Tues., 4 P.M., Lecture by Dr. John Parkinson on X Ray Examination of the Heart. No fee.—ROYAL WESTMINSTER OPHTHALMIC HOSPITAL, Broad-street, W.C. Thurs., 2.30 P.M., Demonstration by Mr. M. L. Hine. No fee.—NATIONAL HOSPITAL FOR DISEASES OF THE HEART, Westmoreland-street, W. Thurs., 3 P.M., Demonstration by Dr. F. W. Price. No fee.—WEST END HOSPITAL FOR NERVOUS DISEASES, 73, Welbeck-street, W. Special Post-graduate Course of Lectures and Clinical Demonstrations. Daily at 5 P.M.—LONDON LOCK HOSPITAL, Dean-street, W. Post-graduate Course in Venereal Disease. Clinical instruction daily in the afternoons and evenings for four weeks.—ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, Great Portland-street, W. Second week of Post-graduate Course in Orthopædics occupying all day.—Further particulars from Fellowship of Medicine.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY, March 17th.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.
TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Ear, Nose and Throat Clinics. Operations.
WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.
THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, Nose, Throat, and Ear Clinics. Operations.
FRIDAY.—10.30 A.M.: Throat, Nose, and Ear Clinics. 2.30 to 5 P.M.: Surgical, Medical, and Children's Diseases. Clinics. Operations.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James Hospital, Ouseley-road, Balham, S.W.
THURSDAY, March 20th.—4 P.M., Dr. Maurice Davidson: Some Points in Differential Diagnosis and Treatment in Diseases of the Chest.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark Hill, S.E.
THURSDAY, March 20th.—9 P.M., Dr. H. G. Hodgson: Radiology.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL.
FRIDAY, March 21st.—4 P.M., Mr. Nicol Rankin: Acute Affections of the Pharynx.

ROYAL DENTAL HOSPITAL OF LONDON, Leicester-square, W.C.
WEDNESDAY, March 19th.—6 P.M., Mr. E. W. Fish: A Theoretical Review of Treatment of the Dentine.

NATIONAL HOSPITAL POST-GRADUATE COURSE, Queen-square, W.C.
MONDAY, March 17th.—12 noon, Dr. Greenfield: Pathology of Nervous System. 2 P.M., Dr. Riddoch: Out-patient Clinic. 3.30 P.M., Dr. Adie: Forms of Muscular Atrophy.
TUESDAY,—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Dr. Grainger Stewart: Acute and Subacute Myelitis.
THURSDAY,—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Dr. Riddoch: Headache.
FRIDAY.—12 noon, Dr. Purdon Martin: Anatomy and Physiology of Nervous System. 2 P.M., Dr. Adie: Out-patient Clinic. 3.30 P.M., Dr. Symonds: Disseminated Sclerosis.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, March 18th.—4.15 P.M., Mr. C. Roberts: Carcinoma of the Rectum.
FRIDAY.—4.15 P.M., Dr. F. R. Ferguson: Demonstration of Medical Cases.

ANCOATS HOSPITAL POST-GRADUATE COURSE, Mill-street, Manchester.
THURSDAY, March 20th.—4.15 P.M., Dr. N. Kletz: Affections of the Kidneys with Special Reference to Nephritis.

UNIVERSITY OF SHEFFIELD POST-GRADUATE CLINICS.
FRIDAY, March 21st.—3.30 P.M. (at the Royal Infirmary), Dr. Hallam: Some Common Skin Diseases.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, March 19th.—4.15 P.M. (Royal Samaritan Hospital), Dr. D. Shannon: Gynæcological Cases,

Appointments.

CAMPBELL, J. M. H., M.D., B.Ch. Oxf., F.R.C.P. Lond., has been appointed Physician to Out-patients, National Hospital for Diseases of the Heart.

FRANKS, C., M.D. Brux., L.S.A., D.P.H., Deputy Medical Officer of Health for Durham County.

HANNA, MARGARET R., M.B., B.Ch., D.P.H. Belf., Assistant Medical Officer of Health, Huddersfield.

IREDELL, C. E., M.D. Lond., M.R.C.P. Lond., M.R.C.S., Physician in charge of Electro-Therapeutic Department, Freemasons Hospital and Nursing Home, Fulham-road, S.W.

LOBBAN, J. W., M.B., Ch.B. Aberd., D.P.H., Assistant Medical Officer of Health and Assistant School Medical Officer for Chester.

RIDDELL, JAMES W. G. H., M.D. Edin., F.R.C.S. Edin., Honorary Assistant Surgeon in charge of the Obstetrical and Gynæcological Department, South Devon and East Cornwall Hospital, Plymouth.

Vacancies.

For further information refer to the advertisement columns.

Albert Dock Hospital, Connaught-road, E.—M.O. At rate of £110.
Aylesbury, Royal Buckinghamshire Hospital.—Res. M.O. At rate of £180.
Barbados.—Sanitation Officer. £600.
Barnsley, Beckett Hospital and Dispensary.—Jun. H.S. £140.
Birmingham and Midland Eye Hospital.—Res. Surg. O. £150.
Birmingham, Dudley-road Hospital.—Jun. Asst. M.O.'s. All at rate of £200.
Birmingham General Hospital.—Two Res. Anæsthetists. Each £120. Also three Res. H.S.'s. Each £70.
Bolton Infirmary and Dispensary.—H.S. At rate of £150.
Bridlington Borough.—M.O.H., and School M.O. £800.
Brighton, Royal Sussex County Hospital.—H.S. £150.
Bury Infirmary.—Sen. H.S. Also 3rd H.S. At rate of £250 and £150 respectively.
***Burnley, Victoria Hospital.*—H.P. At rate of £125.**
Buxton, Derbyshire, Devonshire Hospital.—Asst. H.P. At rate of £150.
Calcutta School of Tropical Medicine.—Prof. of Path. and Bact. Rs. 850 a month.
Cambridge, Addenbrooke's Hospital.—H.P. Also Two H.S.'s. Each at rate of £130.
Charing Cross Hospital, W.C.—Asst. Physician.
Chester County Mental Hospital.—4th Asst. M.O. £350.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
***Connaught Hospital, Orford-road, E.*—Sen. Res. M.O. At rate of £150. Also Res. H.S. and H.P. Each at rate of £100.**
Dreadnought Hospital, Greenwich.—H.P. and H.S. At rate of £110.
Dudley, Guest Hospital and Eye Infirmary.—Asst. H.S. £150.
Durham County Council.—Venereal Diseases M.O. £750.
East London Hospital for Women and Children, Shadwell, E.—Cas. O. At rate of £125.
***Edinburgh Hospital for Crippled Children.*—Surgeon. £1000.**
Evelina Hospital for Children, Southwark, S.E.—H.S. At rate of £120.
***Freemasons Hospital and Nursing Home, 237, Fulham-road, Chelsea, S.W.*—Radiologist.**
Guildford, Royal Surrey County Hospital.—H.S. £150.
Hertfordshire County Council, County Sanatorium, Ware Park.—Asst. M.O. £350.
Hospital for Sick Children, Great Ormond-street, W.C.—Res. M.O. for County Branch Hospital, Tadworth, Surrey. At rate of £250.
Hospital for Tropical Diseases, Endsleigh-gardens, W.C.—Two H.P.'s at rate of £150.
Howe, Lady Chichester Hospital.—Jun. H.P. At rate of £50.
Hull Royal Infirmary.—H.S. Also Cas. H.S. At rate of £150 and £130 respectively.
***Ipswich, East Suffolk and Ipswich Hospital.*—Two H.S.'s. Each £120.**
Ipswich Sanatorium.—Asst M.O. £350.
***Kensington, Fulham, and Chelsea General Hospital, 194, Finborough-road, Earl's Court, S.W.*—Res. Cas. M.O. At rate of £100.**
Kettering Urban District Council.—Part-time M.O. for Antenatal Work.
Leeds Public Dispensary.—Jun. Res. M.O. £150.
Liverpool, Hahnemann Hospital, Hope-street.—Res. M.O. At rate of £100.
***Liverpool Open-air Hospital for Children, Leasowe.*—Jun. M.O. £150.**
Liverpool, Royal Southern Hospital.—H.P., H.S., and M.O. Each £60. Also Cas. O. £100.
L.C.C.—Med. Supts. for Public Health Dept. £750–£1000.
L.C.C. Public Health Department.—Temp. Asst. Aurist. 34*s.* 6*d.* per session.
London Hospital, E.—Asst. Radiologist.
London Lock Hospital, 91, Dean-street, W.—1st and 2nd H.S.'s Each at rate of £200. Also Surg. Reg. £100.
London Lock Hospital, 283, Harrow-road, W.—Surg. Reg. £100.
London Temperance Hospital, Hampstead-road, N.—Res. M.O. Also H.P. At rate of £175 and £100 respectively.
Macclesfield General Infirmary.—2nd H.S. At rate of £150.
Manchester, Ancoats Hospital.—Res. Surg. O. £200.
Manchester Babies' Hospital, Burnage-lane, Levenshulme.—Jun. Res. M.O. At rate of £50.
Manchester Royal Children's Hospital, Pendlebury.—Asst. Phys. £50.
Manor House Hospital, Golders Green, N.W.—H.S. At rate of £200.
Metropolitan Hospital, Kingsland-road, E.—Physician to Dept. for Diseases of Skin.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Res. M.O. £250.
New Zealand, Wellington General Hospital.—Radiologist. £900.
Northern Rhodesia, Roan Antelope Copper Mines, Ltd.—2nd M.O. £900–£1000.
North Riding of Yorkshire County Council.—Asst. M.O. £600.
Northwood, Middlesex, Mount Vernon Hospital.—Radiologist. £1000.
Norwich, Norfolk and Norwich Hospital.—Hon. Asst. S.
Nottingham City Infirmary.—Res. Med. Supt. £900.
Nottingham General Hospital.—2nd Cas. O. At rate of £150.
Oswestry, Shropshire Orthopædic Hospital, &c.—Two H.S.'s. Each at rate of £200
Portsmouth, St. Mary's Hospital, Institution, and Children's Home.—3rd Asst. Res. M.O. £250.
Prince of Wales's General Hospital, Tottenham, N.—Hon. Phys. Also Sen. H.P., Sen. H.S., and Special H.S. Each at rate of £120. Also Jun. H.P., and Two Jun. H.S.'s. Each at rate of £90.
St. Helens Hospital, Lancashire.—Res. M.O. £250.
St. Mary's Hospital, W.—Sen. and Jun. Clin. Assts. £100 and £50 respectively. Also Obstetric Registrar. £50.
Salford City.—Jun. Asst. for Venereal Diseases Centre. £500.
Salford City Infectious Diseases Hospital.—Jun. Asst. Res. M.O. £200.
Salford Royal Hospital.—H.P., Two H.S.'s, also Cas. H.S. All at rate of £125.
Sheffield Royal Infirmary.—Ophthalmic H.S. At rate of £80.
Society of Apothecaries, Water-lane, Blackfriars, S.E.—Med. Reg. £500.
Stirling District Mental Hospital, Larbert.—Jun. Asst. M.O. £300.
Stockport, Stepping Hill Hospital, &c.—Res. Asst. Med. Supt., &c. £300.
Surrey County Council.—Asst. M.O. £600.
Wakefield, Clayton Hospital.—Two H.S.'s. Each at rate of £150.
Walsall General Hospital.—Cas. H.S. At rate of £120.
Watford, Herts, Peace Memorial Hospital.—2nd Res. M.O. At rate of £150.
West Bromwich and District General Hospital.—Cas. H.S. At rate of £200.
West Bromwich, Hallam Hospital.—Res. H.S., and Res. H.P. Each £250.
***West London Hospital, Hammersmith-road, W.*—Hon. Asst. Surg., Hon. Med. Reg., and Hon. Obstet. Reg.**
Woolwich and District War Memorial Hospital, Shooters-hill.—H.P. and H.S. Each at rate of £125.
Willesden General Hospital, N.W.—Clin. Assts. to Surgical Out-patients' Dept.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Ramsey (Hunts), Llandudno (Caernarvon), and at Rhayader (Radnor).

Births, Marriages, and Deaths.

BIRTHS.

HOBBS.—On March 9th, at 4, Downing-street, Farnham, the wife of F. B. Hobbs, M.D., M.R.C.P., of a son.

KILNER.—On March 3rd, at North Hill, Bury St. Edmunds, the wife of Dr. S. D. Kilner, of a daughter.

TOOP.—On March 3rd, at Advie, Brunswick-road, Sutton, the wife of Dr. Howard Toop, of a son.

MARRIAGES.

GAVIN—HARRIS.—On March 4th, at Christ Church, Westminster, Dr. Alexander Gordon Douglas Gavin, M.C., to Helen Mary, elder daughter of Mr. and Mrs. G. F. Harris, of St. James'-court, S.W.

HAUXWELL—REID.—On March 10th, 1930, at the Parish Church of South Clapham, London, by the Rev. W. A. Dunn, Frank Hauxwell, M.B., Ch.B., D.P.H., Medical Officer of Health, St. Helens, Lancs, eldest son of the late Rev. F. M. and Mrs. Hauxwell, Carluke, Lanarkshire, to Margaret A. Reid, M.B., Ch.B., eldest daughter of Mr. and Mrs. Reid, 4, Abbeville-road, South Clapham, London.

STRUTHERS—TOUGH.—On March 3rd, at Holy Trinity Church, Edinburgh, John William Struthers, M.B., F.R.C.S., to Theresa Anne Ross, widow of Captain J. J. Tough, R.A.M.C.

DEATHS.

GAMACK.—On March 8th, at Oriel House, Lindfield-gardens, Hampstead, Alexander Gamack, M.D., aged 96.

GIMLETTE.—On March 7th, at Sandford House, Merton-road, Southsea, George Hart Jesmond Gimlette, C.I.E., M.D., Lt.-Col., retired, Indian Medical Service.

PIPER.—On March 5th, suddenly at King's Leigh, Whitstable, Francis Parris Piper, M.B. Lond., M.R.C.S., L.R.C.P., M.O.H.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

MUNICIPAL CONTROL OF THE SALE OF MILK AND BREAD.

THE Local Authorities (Enabling) Bill, which was given a second reading in the House of Commons on Feb. 14th, proposes to put a public authority on the same footing as a limited company or any other company. A township could then trade generally, although the sponsor of the bill Mr McShane, said he would be satisfied if trading were to be established only in coal, meat, milk, and bread, and in what had been such a success in Birmingham, a municipal bank. He described the transformation which had taken place in local administration, especially in regard to the public health, since 1840. That great transformation, he said, had been the work of the local authorities. It was due to the services rendered by nurses, doctors, teachers, and sanitary inspectors. He desired that the work of those great local authorities should be extended. Up to the present local authorities had been allowed, with the exception of certain monopolies such as water supply, electric and gas supply, tramways, omnibuses, and so forth, to deal solely with questions of sewerage, drainage, and public health, in connexion with which very little profit could be derived. But what was the use of all their medical officers, nurses, inspectors, hospitals, and sanitation, if the food which large populations ate to-day was very largely poison?

Municipal Sale of Milk.

Milk, Mr. McShane went on to say, was one of the most unsatisfactory portions of the food supply of the people, in spite of a host of inspectors. In going through the Ministry of Health report for 1928 he noticed that out of more than 67,000 samples of milk taken at random, no fewer than 5542 were reported as adulterated, or 8·2 per cent. Last year Glasgow destroyed no less than 95 tons of foodstuffs as being diseased or unsound. They did not know how much of the food which was equally diseased was never discovered. The Birmingham medical officer of health reported in 1928 that 91 samples of milk were taken at random, and were found to be infected by tuberculosis. His inspectors paid 100 visits to 69 farms. They examined 744 cows and found 80 of them infected. The Manchester city council in 1920 set up a committee of inquiry with regard to the municipal retailing of milk. That committee reported that the quality of the milk then being retailed in Manchester was abominable. Two-thirds of it, it was alleged, were so dirty that if it were being retailed in New York it would have only have been allowed to be used for cooking purposes. The Manchester council, when dealing with the report of the committee, declared that if they were to undertake the municipal sale of milk they could save £70,000 annually, after compensating the private owners, and incidentally save hundreds of lives. The council, however, unfortunately turned down the proposal. The Food Council had reported that the books of the five private milk firms whose business they had had under review showed a profit of not less than 49·7 per cent. of their investments, and that there was no justification for the increase in price. To-day, millions of money were being wasted by the Government and the local authorities in trying to restore the health of the people who had suffered from the serious ill-effects of adulterated food. If, said Mr. McShane, they were given the powers conferred by this Bill he believed that the local authorities might show an example and an inspiration to the whole world.

Wasteful Methods in the Baking Industry.

Dr. Salter, in seconding the motion, said that he had a very close knowledge of the baking industry, and he knew that the present system was thoroughly wasteful and extravagant, and the cost of a loaf of bread was far higher than it need be. It involved a great waste of human life and effort. The bread industry in small bakeries was exactly comparable with the old hand loom weaving and spinning of 120 years ago. He approached the matter of milk more from a point of view of public health than from the economic standpoint. He was prepared to claim, after a considerable study of the subject, however, that the saving to the public would be just as great with regard to milk as in regard to bread. Everyone knew that it was almost impossible to secure a pure milk supply in any of the great towns, and the greatest danger from which they suffered was from tuberculosis. Eight per cent. of the milk which came into London was definitely tuberculous according to the official figures. Sometimes the percentage was as high as 20. Every year from 13,000 to 15,000 tuberculous milch cows were slaughtered in this country, but apparently the number of tuberculous cattle never diminished. With 2,000,000 milch cows in the country there were only 850 herds known to be tubercle free. It ought to be known that living tubercle in milk was an infective agent to a human subject. Each year 2300 human beings died in this country from tuberculous disease caused by the bovine bacillus, and probably hundreds of thousands more suffered disfigurement, deformity, and permanent disability. The bovine bacillus reached human beings almost exclusively through the agency of tubercle infected milk, yet practically nothing was being done by the Ministry of Health or the Ministry of Agriculture, or both together, to protect the public from this source of infection. There were a number of Members of the House much interested in this subject. Dr. Hastings, Lieut-Colonel Fremantle, himself, and others had endeavoured to get something done in regard to this question of bovine tuberculosis. They were deeply disappointed to find how little progress had been made recently, and what little prospect there was of getting anything further done in the immediate future. The more he studied the subject the greater the inherent difficulties appeared to be under the existing conditions of privately owned and privately distributed milk supply. This poisonous milk was coming into the cities every day, and being drunk by the children. Although the number of deaths was slowly decreasing, yet, taking the most optimistic view, an enormous number of years must elapse under present conditions before the disease was exterminated. If a town were allowed to supply milk to its own inhabitants they would, Dr. Salter concluded, very rapidly effect a change. There would be an immediate veterinary inspection of every cow, and every tuberculous cow would be immediately eliminated from the herd or herds from which the milk supply of the town was drawn.

NEW PREPARATIONS.

SQUIBB'S COD-LIVER OIL (E. R. Squibb and Sons, New York. (Sole Selling and Distributing Agents: J. C. Gambles and Co., Ltd., 211, Blackfriars-road, S.E.1.)—We have received two preparations of this oil and on the nutritive value of pure cod-liver oil no words are needed. One of these preparations is mint flavoured with a view to disguise the taste which some children find particularly disagreeable, but as a matter of fact it is the experience of many doctors and nurses that if it is not suggested to children that they will very much dislike the medicine they seldom raise any protest. Both samples are neatly put up in air-tight screw-topped bottles, and the caution is given that the preparation should always be kept in a cool place.

CREMOR ALKALINUS A. AND H. (Allen and Hanburys, Ltd., 7, Vere-street, W., and 37, Lombard-street, London, E.C.).—This preparation is designed to assist in the intensive alkaline treatment of gastric and duodenal ulcers, and forms a response to recent revival of the treatment on scientific foundation. We have received two samples, labelled formula "A" and formula "B." The standard preparation A contains: sod. bicarb., 2 parts; mag. carb., 4 parts; calcium carb., 4 parts; bismuth carb., 1 part. Formula "B" is made up in the following proportions: sod. bicarb., 2 parts; mag. carb., 3 parts; calcium carb., 4 parts; bismuth carb., 2 parts, the bismuth being increased and the magnesium decreased in cases where the standard preparation proves too laxative. Each bottle contains eight ounces and is issued with careful directions as to dosage, the outline of treatment being that laid down by Prof. Hugh MacLean and others (See THE LANCET, Jan. 7th, 1928).

THE AVAILABLE SUPPLY OF RADIUM.

A CORRESPONDENT has called our attention to a statement made by Prof. R. B. Moore, Chief Chemist to the United States Bureau of Mines, that more than half the available supply of radium is at present utilised for luminous signs. In view of the fact that only about 550 grammes of the element have been isolated, and that almost every hospital and clinic in the civilised world requires more radium than it has got at present for research and for the treatment of patients, he regards the use of the element for non-medical purposes as something of a scandal. We are told, however, that the present medical difficulty is not an actual shortage of radium element but simply that we are not rich enough to buy it; in that case the signs may be regarded in the light of a useful pool on which to draw for medical purposes when anyone has the money. At present it seems that in the United States of America, at any rate, people can afford luxuries but not necessities.

RADIUM: AN UNRETURNED LOAN.

Dr. Arthur Whitfield, 135, Harley-street, W., writes: Some two to three years ago I lent my small amount of radium to a doctor to treat a patient of his. Unfortunately I forgot to make a note of his name, and I have no means of finding it. He has probably finished with it and forgotten to return it. If this letter should catch his eye, will he kindly send it back to me?